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THE

The Ophthalmic Review

A RECORD OF OPHTHALMIC SCIENCE.

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INDEX, 1909.

A

Adam. Therapeutic pocket-book, 338.

Adams. Family displacement of lenses, 213; family opacity of lenses, 214.

Albino negro, 339.

ALEXANDER. PROPERTIES OF THE CONVEX LENS, 123.

Aniridia, 89, 299.

Antiquity, glasses in, 60.

Antonelli. Traumatic hæmorrhage. 360.

Arcus senilis, 91.

Artery, cilio-retinal, obstructed, 88.

Astigmatism, disappearance of, 354.

Atoxyl, action of, on the eye, 276. 324.

Atropine, abuse of, in refraction, 183.

Aurand and Rollet. Sympathetic ophthalmia, 263.

AXENFELD. SERUM THERAPY IN OPHTHALMOLOGY, 1, 31, 63.

Axenfeld. Lehrbuch, 175; Bacteriology of the eye, 210.

B

Bach. The pupil, 72.

Bardsley. Needle-holder, 71.

Barrington and Pearson. Inheritance of vision, 134.

Batten. Hereditary optic atrophy, 90; the Hydrophthalmoscope, 372.

Béal. Retinal hæmorrhage from compression, 361.

Beaumont. Oxycephaly, 373.

Beauvois. Septic keratitis, 150.

Behse. Action of quinine on retina, 299.

Benedek, von. Pre-retinal hæmorrhage, 292.

Benham's colour top, 86.

Bergin. Tubercular swelling of lids, 213.

Bernardon and Delord. Luxation of globe, 261.

Berry. Presidential address, 342.

Bettremieux. Sclerectomy, 200.

Bickerton. Concussion changes, 92.

BIFOCAL LENSES, 12.

Bile, bacteriolytic action of, 269.

Binocular vision, measurement of, 374.
Birch-Hirschfeld. Detachment of retina, 296.
Bjerke. Squint, 149.
Blair. Pemphigus of conjunctiva, 213.
Blindness, prevention of, 250.
Bonsignorio. Eye diseases due to cold, 331.
Bordley. Colour fields in cerebral tumour, 362.
Börnstein. Lens albumen, 321.
Brewerton. Cyst of iris, 90.
Brinton. Irritation of trigeminus, 306.
Bronner, A. Iridectomy in acute iritis, 30.
Bull. Infection of orbit, 110.

C

Cabannes. Pterygium, 144; Trephining in optic neuritis, 365.
Calderaro. Photopsiæ, 259.
Capsculo-pupillary membrane, 373.
Cargill. Quinine amblyopia, 91; X-rays in rodent ulcer, 91.
Carpenter. Oxycephaly, 117; tubercle of choroid, 180.
Cataract, electric, 323.
CATARACT EXTRACTION, IRRIGATION IN, 311, 343.
  extraction, 29, 318, 321, 370.
  family, 85, 244, 339.
  in girl, 212.
  glaucoma secondary to, 203.
  incipient, treatment of, 240, 271, 275.
CATARACT, RECLINATION OF, 314.
Cataract, secondary, 323
Catarrh, spring, cured by radium, 181.
Chamber, anterior, filament in, 215.
Charamis. Glasses in antiquity, 60.
Choked disc, 174.
Choroid, tubercle of, 180.
Choroidal degeneration, 373.
Cirincione. Lachrymal gland, 25.
CLARK, SOMERTON. RECLINATION OF CATARACT, 314.
Coburn. Ophthalmo-tonometer, 207.
Cold, eye diseases due to, 331.
Collins, anterior staphyloma, 119; corneal changes, 180; nodular leprosy, 179.
Colour blindness, artificial, 121.

Colour fields in cerebral tumour, 362.
Colour sense measurement, 140, 244.
Colour test lantern, 117.
Conjunctiva, pemphigus of, 213.
Conjunctivitis, chronic, 235; membranous, 233; petrificans, 163; from bacillus pyocyaneus, 236.
Connor. Incipient cataract, 271.
Cornea, changes in, 180; flattened, 91.
CORNEA, MALFORMATION OF, IN INHERITED SYPHILIS, 247.
  opacity of, 85, 276.
  rupture of, 285.
  wounds of, 171.
Corneal fistula, 201.
Cruise. Atropine in refraction, 183.
Cunningham. Case of Aniridia, 89.
Cushing. Colour fields in cerebral tumour, 362.
Cyclodialysis, 194.
Czermak. Operations, 176.

D

Dacryocystitis, 287.
DACRYOCYSTITIS AND OPERATIONS ON THE GLOBE, 279.
Davids. Tuberculin in ocular tuberculosis, 81.
Davidson and Lawson. Radium in eye diseases, 181, 245.
Del Monte. Conjunctivitis petrificans, 163.
Delord and Bernardou. Luxation of globe, 261.
Demicheri. Histology of irido-sclerectomy, 49.
DIAPHRAGM TEST, THE, 93, 374.
DIPLOSCOPE, THE, 9.
Dionine, new form of, 310.
Dorrell. Choroidal degeneration, 373.
Doyne. Opacity of cornea, 85.
Dransart and Famechon. Miners' nystagmus, 51.
Ducroquet and Pechin. Writing, 58.
Dunn, J. Value of sphygmomanometer, 208.
Duverger and Morax. Wounds of cornea, 169.

E

Edridge-Green. Colour test, 117, 244; artificial colour blindness, 121.
Elliott, Major. Cataract extraction, 29.
Exophthalmos, pulsating, 363.

F

Fage. Rupture of cornea, 285.
Famechon and Dransart. Miners' nystagmus, 51.
  ptosis operation, 211.
FERGUS, A. FREELAND. LACHRYMAL OBSTRUCTION, 107.
Fergus. Ptosis operation, 211.
Fisher. Cataract in girl, 212; marginal keratectasia, 340.
Fisher and Verhoeff. Bleaching tissues, 270.
Frenkel. Hæmorrhages after iridectomy, 55.
Fridenburg. Nystagmus, 53.
Frontal sinus inflammation, 111.
FUCHS. MALFORMATION OF CORNEA IN INHERITED SYPHILIS, 247.
Fuchs. Sympathetic ophthalmia, 254.

G

Gauge, inter-pupillary, 162.
Gaupillat. Ophthalmia Neonatorum, 60.
Gerber. Frontal sinus inflammation, 111.
Gibson. Plumbic ocular neuritis, 17.
Gifford. Sympathetic after Mules' operation, 141; recurrent pterygium, 142.
Ginsberg. Retinitis pigmentosa, 267.
GLAUCOMA, TREATMENT OF, 185.
GLAUCOMA IN YOUNG PATIENTS, 153.
  in albuminuric retinitis, 204.
  experimental, 334.
  field of vision in, 42.
  hæmorrhagic, iridectomy in, 56.
  personal experience of, 358.
  sclerectomy in, 47, 49, 211, 340; posterior sclerectomy in, 198; secondary to cataract, 203.
Griffith and Ormond. Retinal exudation, 214.
Grimsdale. Retraction of globe, 340.
Guthrie. Retrobulbar optic atrophy, 118.

H

Hæmorrhage into optic nerve sheath, 91.
Hæmorrhages, traumatic, into the eye, 360, 361.
Hancock. Pituitary neoplasm, 89.

HARMAN, N. BISHOP. THE DIAPHRAGM TEST, 93, 374.
  THE DIPLOSCOPE, 9.
  CASE OF EXTREME HYPERMETROPIA, 217.
  IRRIGATION IN CATARACT EXTRACTION, 311.
  RETRACTOR FOR LACHRYMAL SAC, 316.
  complete cataract in a boy, 86.
  family cataracts, 88, 244, 339.
  muscular anomaly, 88.
  negro, albino, 339.
  school life and vision, 302.
  substitute for tobacco, 88.
Haslam. Pulsating exophthalmos, 363.
Headaches, ocular and nasal, 326.
Hemiopic pupil, 78.
Henderson, T. Schlemm's canal, 26.
Herford. Trachoma, 114.
Hesse. Hemiopic pupil, 78.
Hird. Pulsating exophthalmos, 363.
Hirschberg. Renaissance de l'ophtalmologie, 306.
Holth. Central colour scotomata, 274.
Höpner. Operation for myopia, 228.
Hosford. Hyaline bodies in vitreous, 92.
Hyaline bodies in vitreous, 92.
Hydrophthalmoscope, 372.
HYPERMETROPIA, EXTREME, 217.
Hypophoria, measurement of, 374.

I

Igersheimer. Atoxyl and the eye, 324.
Imai. Operation for myopia, 228.
Incision of the eye, 282.
Inflammations, chronic, of the eye, 303.
Inouye. Detachment of retina, 296.
INSTRUMENTS, PLATED, DANGER FROM, 190.
Ionic therapeutics, 145.
Iridectomy in acute iritis, 30.
Irido-dialysis, operation for, 283
Iris, cysts of, 90, 173.
  dislocation of, 182
  tubercle of, 119.

Iritis, gummatous, 83.
  iridectomy in acute, 30.
Ischreyt. Glaucoma secondary to cataract, 203.

J

Jackson. The Ophthalmic Year Book, 59.
James, G. Brooksbank. Operation for Glaucoma, 340; for squint, 28.
Jameson. Operation for iridodialysis, 283.
Jessop. Notation of visual acuity, 216; ophthalmoplegia, 212.
  tubercle of iris, 119.
Juselius. Cysts of iris, 173.

K

Keratitis, hypopyon, 337.
Keratitis, nodular, 169, 367.
Keratitis, septic, after injury, 150.
KILLEN. IRRIGATION IN CATARACT EXTRACTION, 343.
Klauber. Pre-retinal hæmorrhage, 292.
Königshöfer. Incipient cataract, 240.

L

Lachrymal fistula, electrolysis for, 239.
Lachrymal gland, development of, 25.
LACHRYMAL OBSTRUCTION, 107.
LACHRYMAL SAC RETRACTOR, 316.
Lagrange. Hypermetropic astigmatism, 354; sclerectomy in chronic glaucoma, 47, 211; tuberculosis of eye, 304.
Landolt. Notation of visual acuity, 352.
Lang. Hæmorrhage into optic nerve sheath, 91; sarcoma of lids, 92.
Laqueur. Glaucoma, 358.
Lawson. Arcus senilis, 91; Lagrange's operation, 211.
Lawson and Davidson. Radium in eye diseases, 181, 245.
Leber. Retinal changes in nephritis, 257.
Lens albumen, 321.
LENS, THE CONVEX, 130.
LENSES, BIFOCAL, 12; TORIC, 130.
Lenses, family displacement of, 213; family opacity of, 214.
Leprosy of eyes, 179, 277.
Levinsohn. Cortex and eye movements, 290.
Levy. Obstruction of retinal artery, 88.

Lindenmeyer. Posterior sclerotomy in glaucoma, 198.
Lotin, electrolysis for lachrymal fistula, 239.
Luxation of globe, 261.

M

Mackay. Filament in anterior chamber, 215.
Macular region, degeneration of, 365.
MAHER. TREATMENT OF GLAUCOMA, 185.
Marjoram, ophthalmia from, 309.
Mayou. Diseases of the Eye, 57; dislocation of iris, 182; retrobulbar optic atrophy, 118.
McKechnie. Incision of the eye, 282.
Meller. Ophthalmic surgery, 19.
Meyerhof. Membranous conjunctivitis, 233.
Miners' nystagmus, 51.
Morax and Duverger. Wounds of cornea, 171.
Movements, eye, and cortex, 290.
Muscular anomaly, 88.
Myopia, operation for, 228.

N

Needle-holder, the Bardsley, 71.
Nerve, paralysis of sixth, 288.
Nesfield. Extraction of cataract, 321.
Nettleship. Pedigrees of Eye Disease, 121.
Nystagmus, 53.
Nystagmus, miners', 51.

O

Oguchi. Corneal fistula, 201.
Onfray. Strabismus, 152.
Ophthalmia neonatorum, 60, 250.
Ophthalmic Surgery, 19.
Ophthalmological Society of the United Kingdom, 26, 85, 117, 178, 211 244, 339, 372.
Ophthalmoplegia, 212.
Ophthalmotonometer, 207.
Optic atrophy, hereditary, 90; unilateral, 373.
Optic neuritis, 179, 263.
    plumbic, 17.
    trephining in, 365.

Optometric scale, 138.
Orbit, infection of, 110.
Ormond. Tubercular mass in choroid, 85.
Ormond and Griffith. Retinal exudation, 214.
Oxley. Extraction of cataract, 318.
Oxycephaly, 117, 373.

P

Paderstein. Nodular keratitis, 169.
Paget's disease, 264.
Parsons. Pathology of the eye, 113; unilateral optic atrophy, 373; white spots in retina, 118.
Pathology of the eye, 113.
Pearson and Barrington. Inheritance of vision, 134.
Pechin and Ducroquet. Writing, 58.
Pedigrees of eye disease, 121.
Percival. Benham's colour top, 86; rhythmic oscillations of pupil, 87.
Perimeter, improved, 27.
Photopsiæ after removal of globe, 259.
Pigmented tissues, bleaching, 270.
Pirquet, v. Cutaneous tuberculin reaction, 79.
Pituitary neoplasm, 89.
Plumbic ocular neuritis, 17.
Pre-retinal hæmorrhage, 292.
Presas. Optometric scale, 138.
Pterygium, treatment of, 143, 144.
Ptosis, adiposa, 368.
    operation for, 211.
Pupil, the, 72.
    hemiopic, 78.
    rhythmic oscillations of, 87.
Pusey. Conjunctivitis from bacillus pyocyaneus, 236.

Q

Quinine amblyopia, 91, 299.

R

Radium in eye diseases, 181, 244.
Refraction, 223, 273.
Retina, concussion changes in, 92.
    detachment of, 296.
    white spots in, 118.

Retinal changes in nephritis, 257
Retinal exudation, 87, 214.
Retinal hæmorrhage from compression, 361.
Retinitis pigmentosa, 151, 267.
Retraction of globe on blinking, 340.
Ricchi. Paralysis after rachidian injection, 288.
Robertson, Argyll. Obituary, 39.
Roche. Electric cataract, 323.
ROCKLIFFE. DANGER OF PLATED INSTRUMENTS, 190.
Roll. Peculiar disc, 179.
Rollet. Gummatous iritis, 83.
Rollet and Aurand. Sympathetic ophthalmia, 263.
Rönne. Field of vision in glaucoma, 42.
Ronvillois. Chancre of bulbar conjunctiva, 333.
Rosenhauch. Hypopyon keratitis, 337.
Royal London Ophthalmic Hospital Reports, 58.

S

Sarcoma of lids, 92.
Sauvineau. Measurement of colour sense, 140.
Schlemm's canal, 26.
School life and vision, 302.
Schreiber. Experimental glaucoma, 334.
Schüssele. Streptococcic inflammations, 329.
Sclerectomy, action of, 200.
    in chronic glaucoma, 47, 49.
Scotomata, central colour, 274.
Seefelder. Aniridia, 299.
SERUM THERAPY IN OPHTHALMOLOGY, 1, 31, 62.
Shoemaker. Retinitis pigmentosa, 151.
Smith, Priestley. Improved Perimeter, 27; pedigree charts, 341; pedigree of discoid cataracts, 341.
Snell, Simeon. Obituary, 159.
Snydacker. Headaches, ocular and nasal, 326.
Sphygmomanometer, 208.
Spindler. Refraction, 273.
Squint, treatment of, 149.
Staphyloma, anterior, 119, 178.
Stargardt. Degeneration of macular region, 365; trachoma, 115.
Steiner. Amyloid degeneration of tarsus, 237.
Stephenson. Anterior staphyloma, 178; capsulo-pupillary membrane, 373.
Strabismus, operative treatment of, 28.

Straub. Refraction, 223.
Streptococcic inflammations of eye, 329.
Sympathetic ophthalmia, 254, 263; after Mules' operation, 141.

T

Tarsus, amyloid degeneration of, 237.
Taylor, Charles Bell. Obituary, 133.
TAYLOR, JOHNSON. OPERATIONS AND DACRYOCYSTITIS, 273
Tenotomy, cosmetic, of recti muscles, 83.
Terson. Diseases of Eye, 243.
Thompson, Hugh. Flattened cornea, 91.
THOMPSON, HUGH. GLAUCOMA IN YOUNG PATIENTS, 153.
Thomson. Pupillary membrane after cataract extraction, 323
Thorner. Choked disc, 174.
Tobacco, substitute for, 88.
Toti. Dacryocystitis, 287.
Trachoma, 114, 115.
Trigeminus, irritation of, 306.
Tschirkowsky. Glaucoma in albuminuric retinitis, 204.
Tubercular mass in choroid, 85; swelling of lids, 213.
Tuberculin reaction, cutaneous, 79.
    in ocular tuberculosis, 81.
Tuberculosis, ocular, 304.

V

Verderame. Bacteriolytic action of bile, 269.
Vergne. Paget's disease, 264.
Verhoeff. Bleaching tissues, 270.
Visual acuity, notation of, 216, 352.

W

Weekers. Iridectomy in hæmorrhagic glaucoma, 56.
    Bacteriolytic action of bile, 269.
Wehrli. Nodular keratitis, 367.
Weinstein. Ptosis adiposa, 368.
Wengler. Experimental glaucoma, 334.
Wernicke. Cyclodialysis, 194.
Wicherkiewicz. Cosmetic tenotomy, 83.
Wirtz. Ionic therapeutics, 145.
Wissmann. Lens albumen, 321.
Wood, Casey. Ophthalmic therapeutics, 241.
Wood, D. J. Retinal exudation, 87.
Wood, Russ. Chronic inflammations, 303.

SERUM-THERAPY IN OPHTHALMOLOGY.*

By Professor Axenfeld (Freiburg).

This relatively new branch of therapeutics, in which I am especially interested, is characterised by the fact that it has frequently evoked on the one hand over-sanguine expectations, and when these hopes have been fulfilled only imperfectly or not at all, it has on the other hand called forth a deep and sometimes exaggerated scepticism. Therefore it is indispensable from time to time to take stock of what must be regarded as already firmly established, in contra-distinction to all doubtful hypotheses.

I am certainly not expected to give you a detailed discussion of the theory of immunity, in the time at my disposal. The subject of my paper must on the contrary be: What therapeutic means have modern researches on immunity placed in the hands of the ophthalmologist? What successes have been hitherto obtained, what rules are indicated in dealing with different diseases, and what are the future prospects of this therapy?

Even these questions can only be treated in very brief outlines. I shall therefore only lay down dogmatically those facts which are generally accepted, and you must excuse me, if this is sometimes done somewhat disconnectedly, but I can the better do so, as in a recent paper Percival Hay gives a detailed review of the question.

This will enable me to give more time to the discussion of those methods, the utility of which is still an open question.

---

* A paper read at the Sheffield meeting of the British Medical Association (1908), inaugurating the discussion in the Ophthalmology Section upon Serum Therapy.

The *eyelids,* the *conjunctiva,* the *orbit,* the *uvea* will in future take part in serum-therapeutics as do the other vascular organs. For infective diseases of the eyelids the same rules hold good as in the case of the skin in general. In obstinate blepharitis and formation of hordeola the subcutaneous application of staphylococcus-vaccine, which may be readily prepared from the patient himself according to the directions of Wright, may prove useful, as may the Sobernheim-serum in the rarely occurring cases of anthrax.

The conjunctiva may show similar conditions; we shall speak of it later.

But the conditions are quite unique in those *non-vascular* refracting media, which taken together form by far the greater part of the volume of the eyeball, and in which bacteria can grow in quite an extraordinary manner, so enormously indeed, that in the vitreous even saprophytic germs can become pathogenetic. To this point we must devote attention for a moment.

Perhaps I may remind you that Loeffler was the first to point out that the normal cornea shares in general bacterial immunity, Roemer proved it with regard to pneumococci, and Ehrlich and Roemer in regard to autotoxic immunity to the toxin of diphtheria. We are entitled to suppose that the cornea would share also in *other* autotoxic or " bactericidal " immunity. But we must not assume off-hand that this holds good to the same extent for every kind of infection. In this respect the results of small-pox vaccination are of great interest. This oldest of all immunizing methods, originated in this country by Jenner and which has long exerted and still exerts such a beneficial influence on the frequency of blindness, immunizes by subcutaneous or intravenous injection the whole body, and only the cornea remains susceptible, although the cornea, if vaccinated itself, acquires a circumscribed local immunity.

To pass on to the consideration of the *anterior chamber*, we know from the work of Roemer, Wessely, zur Nedden, A. Leber, Schneider, Rymowicz, Possek, etc., that into the normal aqueous humour antitoxins, agglutinins and precipitins (Receptors: first order) pass from the blood, in small quantities to be sure, whilst on the contrary bactericidal substances, opsonins, hæmolysins, and cytotoxins (Receptors: third order) do not do so at all. Only after puncture or irritation by means of sub-conjunctival injections, by heating, and especially under the influence of inflammation is the entrance of these substances to be observed.

The *vitreous* finally does not under normal circumstances share in any kind of immunity whatever. It only begins to show traces of immunity bodies after frequently repeated paracentesis, or sub-conjunctival injections, or during inflammation.

It is upon these facts that Roemer's law of "retention of cytotoxins" is based. Consequently an antibacterial serum-therapy, active or passive, must in intraocular diseases, in which the infection has extended to the media, experience great difficulties in its combat against the bacteria.

We must not however forget that we possess the already mentioned means of *increasing* the intraocular immunizing processes, and that the disease itself, the causative injury, the operation, etc., must necessarily produce an increased influx from the altered vessels into the media. Consequently serum-therapy is to be tried also in such cases of corneal and intraocular infection; but it will only be of assistance as an adjunct, and against *virulent* infections, especially in *acute* cases; alone it will not be sufficiently powerful. At all events, for each different kind of bacteria special investigations are necessary to teach us what we have to expect in the different processes of serum-therapy.

I will commence with the results of *antitoxic serum-therapy.*

The healing action of Behring's antitoxic diphtheritic-serum on the conjunctivitis produced by Loeffler's bacilli is so well established by experimental and clinical observation, that it is unnecessary to linger over it.

If a case, in which diphtheria bacilli have been found, will not recover under serum treatment, either the treatment has been commenced too late or we have to deal with a serious mixed infection, probably streptococcal.

For the same reason one cannot be sure that corneal infection already developed will be influenced by anti-diphtheritic serum, because the greatest number of these corneal infections are produced by invasion of pyogenic germs. Nevertheless in such cases the improvement of nutrition by the diminution of conjunctival inflammation and of the paralysing action of the toxin may be of value for the cornea.

Post-diphtheritic paralysis, especially that of accommodation, has been also treated by several authors with anti-diphtheric serum. Fage especially maintains that paralysis of accommodation has disappeared under such treatment more quickly than it usually does.

On the other hand, in statistical papers on serum treatment of throat-diphtheria, one often finds it said that the number of cases of post-diphtheritic paralysis has increased since the introduction of serum-therapy, because far more severe cases remain alive. One would suppose that the serum which is a remedy for post-diphtheritic paralysis should be able also to prevent it.

A few months ago Feilchenfeld in the Berlin Medical Society stated that after the last epidemic, in which serum was much used, a surprisingly large number of post-diphtheritic paralyses were observed. *E.g.*, six out of eight children belonging to one family, all treated with serum, got post-diphtheritic paralysis of accommodation. On the contrary Bylsma writes, that during an epidemic in Holland, the cases not treated with serum showed in a great number paralysis of accommodation, while those on the other hand, which were injected, remained free from it.

I believe that the relative frequency of post-diphtheritic paralysis varies enormously, and that it is therefore difficult to estimate precisely the value of any treatment, all the more that recovery always follows.

From the very earliest times of serum treatment communications were made maintaining that the serum was useful also for cases which did not contain diphtheritic bacilli. (Wagner, Schmidt-Rimpler.) These cases, being of a less serious character, are not convincing. Nevertheless I mention them, because they are the forerunners of the "non-specific serum-therapy," which I shall discuss later.

Another antitoxic serum, occasionally indicated in ophthalmology, is the Tetanus-serum. In the rare cases of tetanus following injury to the eye or its surroundings—they generally begin with the so-called facial type of the disease, especially with paralysis of the muscles of the eyes and of other muscles innervated by cranial nerves—the same rules hold good in the application of antitoxic tetanus-serum as for any other surgical procedure. If tetanus has already set in, the success of serum-therapy can no longer be reckoned upon with certainty. It still remains, however, to be seen whether more may not be attained by the use of larger doses than have hitherto been generally administered; and I may perhaps further allude to the fact, that more recent writers have stated that subdural injections of tetanus antitoxin have given better results.

The prophylactic action of tetanus antitoxin is at any rate greatly superior, though it is to be noted that the 10 c.c., *i.e.*, 100 immunising-units, recommended as sufficient in the instructions issued with Hoecht-serum, do not always prove to be enough. Therefore, at all events we ophthalmologists should make it a rule to inject prophylactically 10 to 20 c.c. of tetanus-serum in specially suspiciously-looking injuries. These are, as it is well known, wounds which are contaminated with earth, manure, street-mud, etc., and among the eye injuries especially[1] those wounds caused by splinters of wood contaminated with mud or by the lashes of whips. In literature there are about fifty cases described, the majority of which proved fatal. I myself have seen three cases of this kind.

It might perhaps be said: Why not restrict the injection of the serum to those cases in which tetanus bacilli are to be found in the purulent discharge? To do this, however, is only possible in very exceptional cases, even if tetanus infection has actually occurred.[2]

Even if there be among the above-mentioned injuries many which do not lead to tetanus, nevertheless the possibility of this deadly disease is sufficient to justify the prophylactic injection of serum. Numerous surgeons, especially Kocher, take this view. One would then expect that tetanus would thus be prevented, or would at all events take a benign course. In cases where tetanus sets in, one is obliged to resort, in addition, to enucleation, if the eye is the site of the injury, so as to remove the source of infection.

In a few words I may mention here the serum-therapy of hay-fever, because this disease is of interest also to ophthalmologists. Dunbar's "Pollantin," prepared by the use of the pollen of grasses, and applicable as powder or as drops on the conjunctiva and the nasal mucous membrane, is considered by its inventor to be an antitoxic serum. Weichart denies the antitoxic character of this serum. He prepared another remedy known as "Graminol," which is also on sale, and is, in his opinion, an "anti-kenotoxin." Without going into fuller detail, I should only like to mention that both preparations are good in some cases, but not in all, and when they do act the result is often not durable. At any rate it is advisable to try this serum-therapy in cases of hay-fever conjunctivitis.

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[1] For the literature cf. Mayweg, *Klinische Monatsblätter für Augenheilkunde*, 1907, iv, p. 120.

[2] Cf. Wirtz, *ibidem*, 1908, v, p. 606.

To autotoxic serum-therapeutics belongs also the application of Roemer's Jequiritol-serum, to arrest violent Jequiritol-ophthalmia and to avoid dangerous complications.

So far as I have been able to learn from the literature[1] and from other sources, jequiritol appears to be very little used in England: I may perhaps here be permitted to say a few words regarding the experience attained with it. In treatment by jequiritol, on the one hand, it is necessary to have a strong reaction in order to clear the pannous cornea, and yet, on the other, this reaction must not be too strong, if we wish to avoid the occurrence of necrosis. Roemer has therefore worked out a graduated application of the jequiritol. If one drops in first a weak solution of the poison and then a stronger, the first introduction produces a slight local antitoxic immunity, which prevents, as a rule, a too powerful influence of the subsequent stronger solution. If, however, in spite of this, too violent a reaction occurs, then, at all events in experiments on animals, the instillation of the antitoxic Antiabrin-serum is capable of rendering milder or reducing these threatening symptoms.

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[1] Cf. the bibliography in the paper of Seefelder, *Klinische Monatsblätter für Augenheilkunde*, 1905, xliii, Bd. 1, p. 272.

This seems at first sight surprising, for when the reaction sets in one would imagine that the "Toxalbumose" was already anchored to the tissues. How then can the administration of the antitoxic-serum at this stage have any effect? We must keep in mind that the toxalbumose becomes only gradually bound, and that the serum, especially if applied subcutaneously or intravenously, can re-attract to itself even the anchored toxin,—at all events in part. Clinical experience has shown that such severe necroses, as formerly occasionally occurred with jequiritol, are avoided by Roemer's graduated jequiritol-treatment. Nevertheless, even in the latter case, undesirable complications have not been rare, especially superficial corneal ulcers and purulent or chronic dacryo-cystitis.

With regard to the preventive and curative effect of the serum, experience has not been uniform. In some observations the pain was reduced and the inflammation decreased; but in the majority of cases the serum-effect was not clear, and did not prevent or cure the above-mentioned complications. The possibility of these complications has restricted the use of jequiritol to those cases of pannus or other vascularised corneal cicatrices, in which other treatment remained unsuccessful and where the possible improvement is of greater importance than the possible complications.

Perhaps more might have been achieved by giving the serum subcutaneously instead of dropping it in, as almost all writers on the subject have done, for the subcutaneous injection is more efficacious, as Roemer has already pointed out.

The very unpleasing complication of dacryo-cystitis may perhaps be avoided by prophylactic injection of serum into the lumen of the tear-sac. It is possible to inject through the canaliculi without letting any of the serum come on the conjunctiva. Such prophylactic injection of serum must be given immediately before the application of jequiritol to the conjunctiva.

Calmette and Delarde have pointed out that the dropping in of serum is of protective value for only a short time, because the antitoxin is not bound by the mucous tissue and disappears in some few hours from the surface.

It need not be feared that this prophylactic injection will render the jequiritol-reaction of the conjunctiva impossible by producing a general immunity. For from the surface of the mucous membrane there will not be produced a general passive antitoxic immunity, either with diphtheria-antitoxin or with antiabrin. I have convinced myself by experiments that the prophylactic tear-sac injection recommended above does not influence the reaction of the conjunctiva.

To be continued.

THE DIPLOSCOPE; AN INSTRUMENT FOR THE EXAMINATION OF BINOCULAR VISION, DEVISED BY DR. REMY OF DIJON.

Dr. Remy has written a number of papers of a lengthy and enthusiastic nature on an instrument which he has called the Diploscope. By means of it he claims to obtain:—

1. A perfect test for pure binocular vision.
2. A certain means of detecting malingering.
3. A delicate and scientific means of detecting the presence of and estimating the variety and quantity of a squint latent or manifest.
4. A means of training and restoring the vision of a squinting eye which has declined from disuse.

These are the chief claims made on behalf of the instrument, there are others that need not engage our notice here.

I found it difficult to ascertain from the original papers at my disposal how the instrument was planned and made, but a letter to the learned doctor brought several papers and reprints dating from 1901.

The earliest would appear to be a thesis; it is a pamphlet of 68 closely printed quarto pages, with several figures, entitled "Le Diploscope et Ses Applications"; the date, 1901, is pencilled on the copy. This is by far the most detailed of the papers on the instrument. There are several others which have appeared at intervals in the *Recueil d'Ophthalmologie;* also the report of a committee of the Academy of Medicine, Paris; and a paper read at the Congress of Ophthalmology, Heidelberg, August, 1908. Unfortunately no one of these papers gives a full account of the plan of the instrument; many of the details have to be sought for in several papers, others have to be guessed at.

The principle of the Diploscope is that of the well-known "Bar-reading test" of Javal.* Remy puts a broad bar at the bottom of a tube, the subject looks into the tube and through the spaces on either side of the bar at certain test letters. In Remy's finished insrument the spaces are round holes of which six are provided, but since only two are used at one observation the other four may be neglected; further to simplify this description I shall neglect the tube and speak only of the bottom—that is a disc with holes.

From the description I now give the reader should be able to set up an improvised instrument, and with that he will be able to test its value.

Take a piece of white card 25 × 10 c.m., mark thereon four letters, say KOLA, each 3 c.m. square and separated from each other centre from centre by 6 c.m.; take a disc of black card 10 c.m. in diameter, cut out of it two holes each 22 m.m. in diameter, and separated centre from centre by 6 c.m. Now fix the test card so as to stand up perpendicular to the end of a stick 120 c.m. in length; at a point 60 c.m. from the test fix a short post perpendicular to the stick and on it pin the black disc with the two holes; turn the disc so that the holes are side by side.

If the experimenter will put the free end of the stick against his nose and look along the stick it is evident he can only see the letters on the test card through the holes in the disc. If he will look at the letters, and he has normal binocular vision, he will see each letter in its proper order, KOLA, and each framed by an image of a hole in the disc—he will see four holes and four letters. Now, on covering one or other eye he will find, that he sees the first and third letter of the test with his left eye, and the second and fourth with his right eye. That, says Remy, is the best test for binocular vision.

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* Study of Javal's test and Remy's papers led me to try reversing the 'bar test.' with results that were brought before the Ophthalmological Society in December last, under the title of "The Diaphragm Test."—N.B.H.

If the experimenter continues to watch the letters his eye-muscles will probably get fatigued; if his eyes diverge he will notice the two central holes approach each other, then fuse, and their letters O and L will be superposed or one will be suppressed; with still greater divergence the letters will be transposed, and appear as KLOA. On the other hand, should his eyes converge, or convergence be produced by a prism, the letters will be transposed and read as OKAL; or if extreme convergence can be obtained with perception of the letters, then they will be read in the order OAKL.

Lateral deviation can be demonstrated in another way. Replace the four-letter test on the model by a card bearing two of the same sized letters, but one above the other and 102 m.m. from centre to centre. Turn the disc round so that the holes take the positions of XI and V on the clock face. Now look at the letters through the holes: if they are erect one above the other there is no lateral diplopia; if they incline so as to be parallel to the holes then there is convergence; if they incline so as to be perpendicular to the holes then there is divergence. The demonstration with two letters is very good.

Now as to the utility of the instrument. I have spent many hours with the model and not without some profit, but there are certain difficulties that appear to invalidate some of the claims put forward for it:—

1. To many it is not easy to follow the direction to look through the holes in the bottom of the tube, even though they have perfect binocular vision, for they tend to look at the tube and so converge. Others, particularly those who can with facility stereoscope prepared pictures without the aid of prisms, tend to stereoscope the two holes and diverge in so doing.

2. For these reasons the test is not a certain trap for malingerers, if a man looks at the tube he may honestly assert he sees no letters clearly.

3. For estimating with certainty the presence and degree of latent squint it cannot touch the Maddox rod test and the tangent scale.

4. For the purposes of exercising the weakened vision of a squinting eye I should judge it is useless; certainly it cannot compare with the adjustable stereoscopes of Priestley Smith, or of Worth, and the numerous pretty and interesting pictures belonging to them, which go far to attract the children for whom alone these exercises are necessary.

If, as I suggest, Dr. Remy claims too much for the instrument, it is still a most interesting development of the bar-test, and a suggestive means of demonstrating binocular vision and divergences therefrom.

N. Bishop Harman.

BI-FOCAL LENSES.

We hope from time to time to call attention to improvements in the manufacture of spectacles and other optical appliances. The following notes on bi-focal lenses have been furnished by a practical optician.

Bi-focal lenses may be divided into two classes, viz.:—

1. Those in which the same kind of glass is used for both distance and reading portions.
2. Those in which the glass used for the reading segment is of a higher refractive index than that which is used for the distance portion.

In the first of these classes are:—

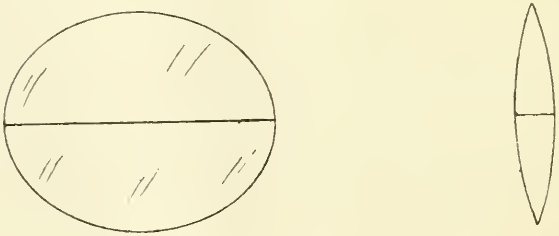

Fig. 1.

1*a*. The "Franklin or "Split" bi-focal, which was the earliest form. The upper portion is one-half of an ordinary lens, and the lower portion is similarly one-half of an ordinary reading lens. These two halves are inserted together as one lens into the eyewire of the spectacle frame.

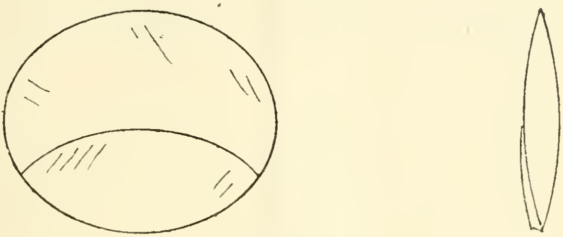

Fig. 2.

1*b*. The "Cemented" bi-focal. This consists of the usual distance lens, on the spherical surface of which is cemented a segment which is equivalent to the required reading addition. This segment is a portion of a periscopic spherical lens one surface of which coincides exactly with the surface of the distance lens to which it has to be cemented, and is usually of such a size that it covers about $^2/_5$ of the distance lens.

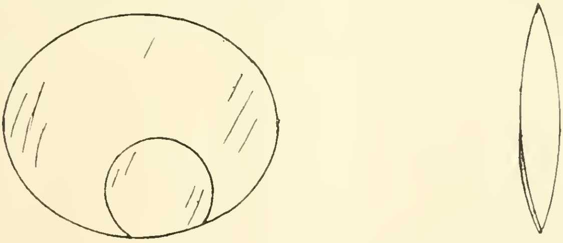

Fig. 3.

1*c*. The "Wafer," or invisible segment bi-focal, is an improvement of the "Cemented" form in which the segment is reduced materially in width and considerably in thickness—being ground as thin as possible. The principle is exactly the same as in the " Cemented " type, but in this form the added segment is practically invisible and does not add materially to the weight or thickness of the lens; while the diminished area of the segment enables the wearer, by looking a little to one side, to see the floor of a room, steps, etc., through the distance portion of the lens, thus removing to a great extent the chief inconvenience of bi-focal glasses.

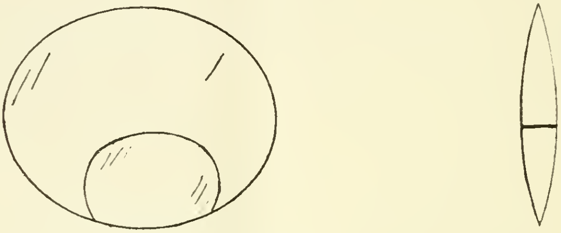

Fig. 4.

1*d*. The " Perfection " is an adaptation of the " Franklin," by which (as in the " Wafer ") the wearer is enabled, by looking slightly sideways, to see the floor, etc. An oval portion is cut out of the distance lens and in its place there is inserted an equally sized portion of a reading lens.

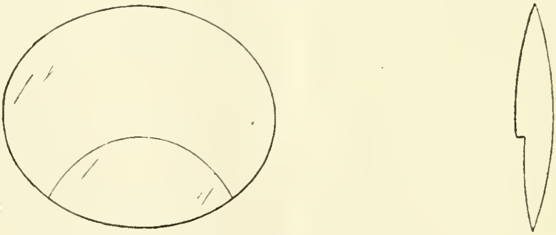

Fig. 5.

1*e*. The " Uni-Bi-focal " consits of a distance lens on the lower portion of the spherical surface of which a second grinding has been made, which makes that part of the lens more convex than the rest. The increase in convexity is, of course, equivalent to the amount of the reading addition.

The different bi-focals in the second class are :—

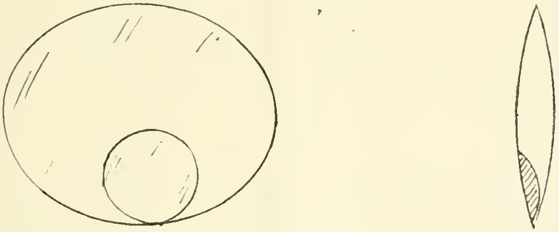

Fig. 6.

2*a*. The "Dunscombe," which consists of a distance lens into the lower portion of which is cemented a smaller lens made of glass of a higher refractive index and so arranged that the external surface of the finished bi-focal has the same curvature in every part and is without any ridge. The distance lens has a deep concave portion hollowed out and into this hollow the smaller lens is cemented, and when set the outer surface is given the required grinding. The depth of the concave grinding in the distance lens and the consequent convexity of the corresponding surface of the smaller lens vary, of course, according to the addition required for reading.

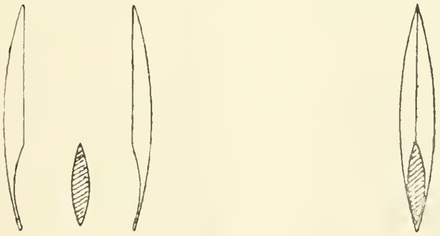

Fig. 7.

2b. In the "Borch" bi-focal an ordinary distance lens is ground in two parts, each having one surface plane. Then on the lower part of the plane side of each of these a hollow is ground and well polished. Into the cavity thus formed a small lens made of glass of higher refractive index is introduced and on all the three parts being cemented together the bi-focal is formed.

This lens was introduced some time ago, but has not enjoyed much popularity. It has a relatively large area of cemented surface and flaws are very apt to appear in it with changes of temperature.

2c. The "Kryptok," or fused bi-focal, is the most recently introduced form and is a development of the "Dunscombe." The difference between the two is that whilst the "Dunscombe" is cemented the "Kryptok" has the two portions fused together. A blank of crown glass has a cavity hollowed out and carefully wax polished. Into this cavity a piece of flint glass is fitted whose surface is ground and polished so that there is perfect contact between the two. They are then carefully heated in an electric furnace to a fixed temperature, when the two surfaces fuse together. If this definite temperature is exceeded the glass becomes molten and the curve between the two is spoilt. When fused the blank is allowed to cool slowly in an annealing oven. It can then be ground just as an ordinary lens, except that care must be take that the grinding of the outer surface does not encroach on the inner curve between the two varieties of glass (see Fig. 6). The depth of this curve is, of course, dependent upon the required addition for reading. A difference of 3D can be obtained without rendering the combined lens unduly heavy.

In all forms of bi-focal the optical centre of the reading lens may be displaced inwards, so as to correspond with the position of the visual axis in convergence.

REVIEWS.

Gibson (Brisbane). **Plumbic Optic Neuritis and Ocular Paralysis in Children.** *Brit. Med. Journ.*, November 14, 1908.

During the three years, from July, 1905, to July, 1908, 62 cases of plumbism were admitted to the Brisbane Hospital for Sick Children, and 13 of these were cases of "ocular neuritis," under which term the author includes affections of the optic and of the external ocular nerves. At the present time, he says, when a child under 8 years of age is brought to the consulting room suffering from a recently-acquired internal squint, and this squint is found to be due to paralysis or paresis of one or both external recti, he expects to find double optic neuritis, and if this be found the provisional diagnosis is lead neuritis.

The disease is characterised by sudden onset of paralysis or paresis of one or both external recti. There is double optic neuritis or choked disc. There is no rise of temperature or albuminuria. There is the blue line on the gums due to deposit of sulphide of lead, and small quantities of lead may usually be found in the urine. At the time of onset there may or may not be preliminary colic, vomiting, constipation, severe headache, rigidity of neck, or retraction of head with acute pain at back of head. Isolated cases are likely to be mistaken for basal meningitis or cerebral tumour.

The children thus affected are almost always between 2 and 8 years of age. In Queensland all cottages and wooden dwellings are raised a few feet from the ground and are surrounded by verandahs in which the younger children constantly play. The verandah railings are painted with a white paint containing the very soluble carbonate of lead. While the paint is still wet, and still more when, by lapse of time, it has become powdery and easily detachable, the children get it on their hands. Observation has shown that those who suffer are especially those who bite their nails or suck their fingers.

Since the source of the poison has been discovered parents have been warned to substitute a harmless white, such as zinc, for white lead on such parts of their houses and railings as are within the reach of children. Fresh attacks, formerly common, especially as regards foot and wrist-drop cases, have thus been avoided. In some cases in which the warning has been disregarded the children have been brought back with relapses. The ocular attacks have seldom been met with in children suffering from foot or wrist-drop, but before the source of the poison was discovered it occasionally happened that a child who had previously suffered from ordinary lead palsy was admitted later with ocular neuritis, or *vice versa*. In some children brought with defective sight slight or pronounced post-neuritic atrophy has been found, and although there was no history of acute attack or of squint, it has been possible to diagnose plumbism and to improve the vision by appropriate treatment. In many older children, some of them occupants of the Blind Asylum, a post-neuritic atrophy can be traced back to the same cause.

The treatment has consisted in removal of the children from their homes, confinement to bed, administration of dilute sulphuric acid and saline laxatives, daily hypodermic injections of pilocarpine continued for six weeks, and, after the first few days, iodide of potassium, the quantity for a child of eight years being 5 grs. thrice daily. In presence of cerebral symptoms lumbar puncture, repeated every few days if the puncture gives indication of increased tension, has lately been found helpful. Anterior arm splints have helped to prevent the nail biting habit.

The ocular cases do not die, and there is an absence, therefore, of post mortem evidence as to the exact nature of the neuritis. Extreme swelling of the discs, viz., 5 to 6 dioptres, is common. Hæmorrhages are uncommon and never large. The optic neuritis has not been seen without the paralysis of one or more of the external muscles. Fortunately the presence of the squint draws attention to the child early in the attack. Vision may still be excellent when the swelling of the optic discs has reached several dioptres. In cases removed from their surroundings and treated before swelling of the discs has existed long, and while sight still remains good the outlook is hopeful, although not certain. The defect of vision, both in acute and in chronic cases, is a diminished acuity with concentric narrowing of the fields. As a rule the colour sense is relatively not more reduced than the light sense. A child who counts fingers at 5 or 6 yards will show no colour scotoma either for white or for colour.

The author gives a series of illustrative cases. P. S.

JOSEF MELLER (Vienna). **Ophthalmic Surgery.** Translation published by Rebman Ltd., London and Philadelphia. 1908.

THERE are two ways in which a book on Ophthalmic Surgery may be written, it appears. One is to describe all the standard operations recognised by good surgeons and teachers of the subject, noting also as of less importance certain of the modifications in the procedure which, from time to time, have been introduced and recommended; the other is to restrict the scope of the work to the particular operations which find favour in a certain clinique. This is what has been done by Meller in the present work, the outside of which bears, therefore, a somewhat misleading title: on the title-page this is expanded (or restricted) to "Ophthalmic Surgery: a Handbook of the Surgical Operations on the Eyeball and its Appendages as practised at the Clinic of Prof. Hofrat Fuchs." It may be quite true that Prof. Fuchs is an admirable exponent of the art of Surgery in relation to Eye disease,, and no one would dream of questioning it, but the value of a book produced on the first system is by 90 per cent. greater than that of one restricted to the practice of one man, however eminent, and we venture to think that a less disingenuous title might well have been chosen.

It goes without saying that the surgical methods recommended are all excellent, for at the great Vienna clinique nothing that was not so would be tolerated, but there is too little margin left for individual variations. Thus "the sutures are to be of silk." Why? Many surgeons prefer horsehair for the purpose. "After previous shaving of the eyebrow a horizontal incision," etc., though a number of operators have the good sense not to shave the eyebrow. These are examples of the narrowness of a book built on such provincial lines, a quality which leads the author to make a few statements also which will not stand the light brought to bear upon them from other cliniques, for example, the hasty generalisations regarding advancement and tenotomy (p. 97). There are very few mistakes in the book, but we notice one on p. 131, where, in the note to fig. 66, some incorrect references are given. A singular statement on p. 194 is to the effect that "the handle of the knife is depressed, *i.e.*, raised," and another on p. 203 is that "it may be irremissible to reduce the tension at once." For the rest, the book is well printed, copiously illustrated, and appears to be well translated. Within its narrow bounds it is quite useful, and to many a former student to whom Vienna is as Mecca to the Moslem it will both revive pleasant memories of the past and prove a sound guide for the future.

V. HIPPEL (Heidelberg). **Palliative Trephining in Choked Disc.** *Archiv für Ophthalmologie*, 69, 2.

VON HIPPEL first describes in detail a case in which decompression was done in the hope of preserving sight. The result of operation was death on the twelfth day. The cause of the optic neuritis was a small sarcoma in the vermis of the cerebellum, and the direct cause of death was sepsis in the hernia cerebri which followed operation.

This case induced von Hippel to review the literature on the subject of palliative trephining, as distinct from operations with removal of a tumour, as far as its effect on optic neuritis was concerned. He finds that decompression operations and their results have been recorded much more frequently in England and America than in Germany and France. He points out that the question is a very important one for ophthalmologists, since optic neuritis may be an early symptom of intra-cranial disease, may indeed give the only indication for operative interference: and, since it is undoubted that the visual prognosis is extremely bad, the question arises whether it is not our duty to advise operation as soon as any disturbance of vision manifests itself. He leaves out of consideration all cases where the cerebral lesion can be localised and operated on, as these belong to the domain of the neurologist. He has found in the literature 221 cases of trephining on account of well-marked papillitis; 53 of these died as a result of the operation almost immediately. Of the remaining 168, the papillitis subsided in 100 cases: in 18 cases it did not subside; in the remaining cases reliable details are wanting. As to vision, in 24 cases there was useful vision at the time of operation. Of these 21 improved or at least preserved what vision they had; 1 got worse, and 2 died as a direct result of the operation. In 14 cases where the vision was practically lost at the time of operation there was distinct improvement after it; and in 26 cases in which no details are given of the history before the operation, improvement in vision is noted as a result. So that in 61 out of 168 cases the results as regards vision were favourable. In 92 cases vision at the time of operation was practically useless. Of these, 20 died immediately, 56 remained *in statu quo*, 14 were improved, in 2 no details are given. The conclusion is that the outlook as regards vision is favourable if the operation is done early in the history of the papillitis, but very bad if done later. Of the cases in which improvement resulted, in 6 this improvement was only temporary. In 198 of the cases the optic neuritis was almost certainly due to tumour. In 89 of those cases the papillitis subsided, in 14 cases it did not. The vision was favourably affected in 45 cases, remained useless in 52, no details as to it are given in 52, while 49 died as an immediate result of the operation.

In considering the question of the value of lumbar puncture and of ventricular puncture, he admits that in certain cases subsidence of the papillitis may take place after these procedures, but maintains that in no case where there was an undoubted tumour has it been shown that lumbar puncture was of any value. He advises, however, that it should be tried in cases of meningitis, of syphilis, or of injury, before resorting to trephining.

Of the *arguments advanced against operation* the first is that the papillitis may subside without affecting the vision. (The author, of course, in his paper is excluding cases of papillitis from other than intra-cranial causes.) In the first rank of these cases where subsidence takes place without operation may be placed those due to syphilis; but it is pointed out that where a gumma of the cerebrum exists, medical treatment may be so slow that considerable loss of vision, and even blindness, may result before healing sets in. In the next rank are placed those cases, well known to English neurologists, where all the symptoms of cerebral tumour are presented without any tumour being found. In these cases subsidence of papillitis may take place without affecting vision. Thirdly, von Hippel refers to the cases of cranial deformity, such as tower skull, in which the optic neuritis often subsides leaving moderate vision. But he thinks even in those cases the prognosis would be improved by palliative trephining.

Secondly, it has been urged that decompression operations may give rise to a confusion of symptoms and so diminish the chance of correct localisation later; but against this argument it can be said that the patient purchases only a very slightly increased chance of life at the cost of certain loss of sight.

Thirdly, it is argued that decompression only puts off the end for a relatively short time. But this argument has little in its favour since the operation influences all the other severe symptoms almost as much as it influences the optic neuritis, and it is surely no small boon to a man who already has much to bear to have his sight at least preserved to him.

A review of the 168 cases as regards duration of life shows some interesting points. Of the 61 cases where the vision was preserved or improved 41 lived more than a year, 25 more than two years, 6 from three to five years, and 10 were apparently cured. Of the 56 whose vision remained practically useless, only 11 lived more than six months, while 44 lived less than six months. Of the 11, 10 lived more than a year, 7 more than two years, 5 from three to five years. Including the cases where details of vision before operation are wanting, one finds that of the total 60 lived more than a year, of whom 26 were seemingly cured, 20 lived more than two years, and 11 lived from three to five years. This surprisingly high number of 26 seemingly cured requires a short explanation. It includes 11 cases of Horsley's, one of which was a malignant tumour, while the other 10 were tumours whose nature could not be determined, but which all disappeared spontaneously after the trephining. These cases, though they are hard to explain, must, having regard to the importance of the authority by whom they are brought forward, be accepted.

The author considers that the immediate mortality (53 out of 221) of the operation is too high, because the majority of the cases were done in too late a stage. And this criticism also he would apply to von Bergmann's statistics, where 47·7 per cent. of deaths occur. He points out that of the 24 cases where the operation was done while there was still useful sight only two died.

He thinks that while we cannot tell the relations that the operation is without danger, it is only right that we should advise them to consent to it, since delay almost inevitably must result in blindness, whilst the outlook as regards vision in the well-timed operation is favourable, life is more frequently lengthened than shortened, the severity of other symptoms is diminished, and in cases which may ultimately be cured blindness is avoided.

The danger of the operation can be materially diminished by a number of precautions which have been devised by Horsley and Kocher. Briefly, these consist of :—Chloroform anæsthesia and not ether; operating in two stages, the opening of the dura being deferred for some days; cocainising the dura before cutting it so as to avoid irritation of its nerves; avoidance of all concussion of the skull and too brisk emptying of large quantities of fluid; avoidance of the osteoplastic method and definite removal of a portion of the skull; and, especially, very careful closing of the flaps so that any prolapse of the brain may be fully covered. He lays stress on the importance in these cases of not trying to prevent a hernia cerebri, since this must be regarded as a safety valve in cases where a very high intra-cranial pressure was manifested.

Subsidence of the papillitis in a few cases may take place without opening of the dura, but in the majority of cases this second part of the operation will be necessary. The subsidence of the papillitis takes place at very varying rates. In one case (Cushing's) a swelling of 7D is said to have disappeared in three hours!

After the clinical portion of his paper, which extends to nearly 40 pages, von Hippel proceeds to consider the relation of the operation to the pathogenesis of papillitis. The dispute, as he considers it, is between the theory that papillitis is primarily a mechanical result of the increased intra-cranial pressure, and the theory that it is an inflammation caused by the toxic products produced by the cerebral new growth.

Uhthoff's distinction between a true neuritis and a choked disc seems to von Hippel not to be borne out in his experience, and he finds that in English and American literature the two terms are used indiscriminately.

Can then any comprehensive explanation of all the cases be based on the theory that 'choked disc' is a primary interstitial neuritis and perineuritis, with secondary inflammatory œdema?

If we consider that even in cases where the dura is not opened the papillitis subsides, and in other cases the subsidence takes place though no fluid comes away at the operation, it seems difficult to think that the papillitis can be due to the presence of these hypothetical toxins which, produced by the tumour, must still be present (though they may be reduced in concentration) and still just as capable of acting on the optic nerve. The only direct proof for the action of these toxins is that anatomically neuritis and perineuritis have been described, but as cases of undoubted papillitis have also been described in which no inflammatory changes were seen it is obvious that these, when they do exist, cannot be regarded as primary.

Again, optic neuritis occurs just as much in extra-dural tumours and blood cysts and even aneurysms in which there is no question of the development of toxins.

Then the rapid subsidence of the neuritis can scarcely be accounted for on any inflammatory hypothesis. For even if we leave out some extreme cases, such as the one previously referred to, there remain many undoubted cases in which it was at least rapid enough to render it unlikely that inflammation could be the primary cause. Is it any more likely that optic neuritis should be of an inflammatory nature and yet relieved by trephining than that the headache and vomiting should be so? For these two symptoms are also relieved by trephining, and they are certainly not due to meningitis, but to the raised intra-cranial pressure.

Elschnig has shown that optic neuritis may be present without any dilatation of the nerve sheath. Neither this nor the absence of flattening of the cerebral convolutions can be accepted as a direct proof that the intra-cranial pressure has not been raised during life. The greatest objection that can be brought against the theory of the raised intra-cranial pressure being the cause of papillitis is the fact that some of the pathological changes which one regards as an expression of increased pressure are absent in many cases.

The few remaining pages of von Hippel's paper are taken up with further discussion of the pathology and morbid anatomy of papillitis, with short descriptions of one or two of his own cases, finishing up with a description of two cases in which papillitis accompanied abscesses in the ear and its associated sinuses.

A bibliography of seven pages accompanies this most interesting and valuable resumé of the present state of our knowledge of palliative trephining for papillitis.

Leslie Paton.

Speciale-Cirincione (Palermo). **The Development of the Lachrymal Gland in Man.** *v. Graefe's Archiv*, 69, 2.

In this interesting paper, which shows most patient and careful investigation of the subject, the author points out the fact that the early stages of the development of the lachrymal gland have hitherto been completely unknown, principally owing to the difficulty of obtaining the necessary material and to the technique of the examination. The embryos must be fresh and well-preserved, from the second month and onwards. The development of the lachrymal gland being very rapid in this stage, a large series of suitable embryos is required to admit both of plentiful stages of transition and of series of sections in various directions.

A collection of this kind was fortunately within the author's reach, and he gives the following résumé of the results of his investigations:—

1. The lachrymal gland is first observed in the human embryo of 32 mm., *i.e.*, about the 70th day or 10th week of its development. It begins with 5 or 6 proliferations of the conjunctiva. These proliferations occur one after another, but within a very short interval (in less than a day).

2. These proliferations appear in the upper portion of the outer fornix of the conjunctiva at its junction with the palpebral conjunctiva.

3. At first these proliferations have the appearance of buds. This stage is, however, quite short, lasting only a few hours; in embryos of 34 mm. all the buds have already changed into clubs. The club stage lasts a few days, corresponding to the growth of the embryo from 34 to 37 mm. During this time the club grows exclusively in a longitudinal direction, and remains a solid protuberance without a central lumen.

4. The first branchings of these five primordial protuberances are observed in embryos of 38 mm.

5. Further proliferations of the fornix, five to eight in number, follow the first in embryos of 40 to 60 mm.; their growth, however, is slow, and they show the first sign of branching in embryos of 54 mm. only.

6. The differentiation of the gland into two portions begins in embryos of 38 mm. The lateral expansions of the tendon of the levator and Tenon's capsule, which begin in embryos of this size, contribute a few fibres to the formation of a fibrous

septum placed along the glandular protuberances and dividing the latter into two unequal parts: the glandular buds which later grow out from the conjunctiva make a halt in their development in front of the septum.

7. In embryos of 60 mm. the division of the gland is completed; the orbital portion is formed exclusively by the branchings of the older (the first 5 or 6) primordial tubes behind the interglandular septum. The palpebral portion is formed by the branchings of the same tubes in front of the interglandular septum, and, further, by the branchings of those primordial tubes which have developed later and did not grow beyond this portion.

8. The structure of the glandular tubes resembles in its first period (club-shape) that of every other embryonal proliferation of the ectoderm: large compressed polyhedric elements with a round nucleus and homogeneous protoplasm. It begins to have an individual appearance when the central elements dissolve so as to leave a free lumen (real tube). This takes place in embryos from 50 mm.; the wall of the tube after the formation of a central lumen consists of two distinctly different layers of cells,—the one the layer of secreting cells, the other that of the basal cells.

A large number of drawings and reconstructions help to render the subject perfectly lucid and easily intelligible.

K. G.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, December 10th, 1908.

The President, Mr Marcus Gunn, *in the Chair.*

1. *Drawings illustrating Connections between Circulus Iridis Major and Schlemm's Canal, traced in Serial Sections.* 2. *Colour microphotographs (Lumière process) illustrating the same as* (1).—Dr. Thomson Henderson.

By means of these illustrations Dr. Henderson demonstrated that there are two venous systems, viz., the Iris veins and Schlemm's canal, the former being the primary and the latter secondary and that therefore the intravenous pressure in Schlemm's canal must be less than that in the iris veins. Absorption of the aqueous must, on this account, take place more readily through Schlemm's canal than through the iris veins, and it is not until the venous pressure in the former rises to that of the latter that the absorptive power of the iris-venous system becomes apparent and effective.

An Improved Perimeter—Mr. Priestley Smith.

Mr. Priestley Smith's original instrument is described in the Transactions of the Ophthalmological Society of 1883. The new model contains the following modifications:—The base is hinged at one end, so that an adjustment for height can be made rapidly by a single movement, all the parts remaining in the same relative position. The slope of the instrument when raised has no disadvantage, but rather the reverse.

The rest for the face is simplified; the button against which the cheek rests is 1 in. in diameter, and its upper margin should stand about 1 in. below the pupil.

The arc, instead of presenting a mere edge, now presents a surface 4 inches wide, which is covered with black woollen cloth so as to afford a uniform dull background for the fixation object. It is cut short at 85° instead of at 90° as heretofore. The test object, if the operator desires to use the radial method, may be a white or coloured knob at the end of a wire, *e.g.*, a hat pin which is held in the hand. When the circular method, which Mr. Priestley Smith considers generally preferable, is employed, the test object is a piece of paper, 2 mm. square, gummed on a cloth-covered carrier which is placed on the arc.

A chart is placed at the back and marked by a scale as before, but the method of marking has been improved. The scale is supplemented by a series of short tubes corresponding in position with the circles on the chart; the test object being placed, for example, at the 10° circle, a pencil is placed in the corresponding tube; the hand wheel is rotated and if the test object disappears at any point the pencil is pressed against the chart until the position is reached at which the test object reappears. To represent faintness of test object over any part of the circle intermittent pressure may be used so as to make a dotted rather than a continuous line upon the chart.

The Diaphragm Test: a new test for Binocular Vision.—Mr. N. Bishop Harman.

The principle of the test is the converse of Javal's bar-reading method.

The instrument consists of a strip of wood 44 cm. long, with a rack at one end to receive the test cards, and a clip at 11 cm. from the rack to hold the diaphragm. The latter is a piece of millboard measuring 9 by 6 cm. with a central aperture. There are two forms of aperture (*a*) a 1·7 cm. square, and (*b*) a circle of 1·7 cm. diameter. A fine wire it attached to the diaphragm and can be brought into the opening so as to form a fixation object when required. By means of a handle beneath the base board the patient holds the instrument, with the free end of the rule against his upper lip.

A card of printed matter being placed in the rack the patient sees it through the diaphragm in such a way that only the middle portion is seen binocularly, the right side of the print is visible to the left eye only, the left side of the print to the right eye only. If a tendency to convergence exists the words are shortened in the middle portion, whereas if there is an inclination to divergence the central letters are reduplicated.

Other devices, such as coloured squares placed at different levels so that it is impossible to fuse them, may be used. A curious result is obtained by using two crosses, thus + ×. At first by fusion an eight-pointed star is produced, but after a short time an alternation of vision sets in, the images of right and left eyes appearing and fading in regular sequence.

Mr. Harman thought that the apparatus would be particularly useful for the detection of malingerers.

A case of Discoid or Coppock Cataract.—Mr. Leslie Paton.

A woman, aged 40, had noticed dimness of sight for 20 years. Vision, with correction, was 6/9. In each lens was a small granular disc, post nuclear, its edges not sharply defined.

The patient was not aware of her defect and there was no history throwing any light on the condition.

PAPERS.

A Note on the Operative Treatment of Strabismus.—Mr. G. Brooksbank James.

In this paper Mr. Brooksbank James described a method of advancement of the external rectus muscle which he had adopted in 35 cases of convergence, and the results in those cases in which the angle of the squint did not exceed 20 degrees were very satisfactory.

The mode of procedure was as follows:—Having isolated the muscle from its surrounding parts, it is grasped in the usual way by Prince's forceps and divided. A short straight double-edged needle threaded with silk is then passed through conjunctiva and Tenon's capsule at the lower border of the tendon and at varying distances from the Prince's forceps; it is then passed vertically through the scleral tissue (well bared by dissecting back a flap of conjunctiva) for about 2 mm. as close to the cornea as possible. Next the needle is carried backwards and is passed through muscle, capsule and conjunctiva about 2 mm. above the point of entry. A similar suture is passed through the upper margin of the muscle. While an assistant adjusts the edge of the muscle held by Prince's forceps the sutures are tightened up and tied, and lastly the forceps are removed by cutting off the necessary portion of muscle.

Mr. James objects to the operation of tenotomy of the internal rectus muscle; and if an advancement of one external rectus is not sufficient to remove the deformity, a similar treatment of the opposite external rectus is resorted to.

Some observations on Cataract Extraction —Major Elliott, I.M.S.

Major Elliott divided his remarks under four main headings :—

1. Antisepsis of the conjunctival sac before operation.
2. The value of laceration of the capsule with Bowman's needle before making the corneal incision.
3. The danger of vitreous loss.
4. The value of free irrigation of the anterior chamber as a means of clearing it of soft lens matter, and preventing inclusion of tags of capsule or iris in the lips of the wound.

As regards the first of these divisions he had adopted many different methods, but had finally come to the conclusion that the following was the most satisfactory one for rendering the conjunctival sac aseptic. Ten minutes before the operation the lids are exposed for 1 or 2 minutes to a stream of Perchloride of Mercury lotion (1 in 3000), and immediately before operation the conjunctival sac is wiped out with cotton wool swabs under a stream of boiled water. The results of this course of sterilization were shewn in some remarkable statistics. Whereas in 1897 there were 98 failures due to sepsis out of 1161 extractions, and again in 1902 4·53% cases of suppuration, in 1907 there was only one case of suppuration in 1000 cataract extractions, and in this instance it was found to be due to overlooked remains of a lachrymal sac supposed to have been excised by another surgeon.

The practice at Madras was to open the capsule with a needle as the first step in the operation, the pupil being previously dilated. Major Elliott recommended the proceeding as allowing free and deliberate division of the capsule in any desired direction, while at the same time valuable information was obtained regarding the size and consistence of the lens. The presence of a Morgagnian Cataract was no contraindication to the employment of a needle in opening the capsule before making the incision. As a matter of practice, the point of the knife could be easily seen even when the fluid contents of the cataract occupied the anterior chamber, and the presence of this fluid actually increased the depth of the chamber thus rendering the passage across of the knife more simple than usual.

Loss of vitreous had always been regarded by Major Elliott as a complication to be dreaded and avoided, though he had personally but little experience of this particular class of case. At the same time if it could be shewn that the fear of escape of vitreous had been exaggerated, he felt that there was very much to be said in favour of the operation for removal of the lens in its capsule.

Major Elliott was a warm advocate of irrigation of the anterior chamber by McKeown's method after removal of the lens. The stream of fluid could be directed to all parts, both beneath and above the iris, thus washing out all soft lens matter, replacing the iris, and removing tags of capsule from the lips of the wound.

Iridectomy in cases of Acute Iritis in which the pupil cannot be dilated.

Dr. Adolph Bronner.

After pointing out that for many years it had been the recognized opinion amongst ophthalmic surgeons that the performance of iridectomy should not be undertaken during the stage of acute inflammation of the iris, Dr. Bronner described 6 cases in which he had performed this operation for the relief of pain, and in order to obtain dilatation of the pupil which had remained inactive in response to the usual treatment with atropine, leeches, and hot bathing. He, however, insisted on the use of the usual local and general remedies even though iridectomy had been performed. The results of the operation had been satisfactory in all his cases, and he suggested that iridectomy should be performed in all cases of iritis where the pupil refuses to dilate in 4 or 5 days under the ordinary methods of treatment. He excludes all cases of serous iritis and of sympathetic ophthalmia.

Malcolm L. Hepburn.

SERUM-THERAPY IN OPHTHALMOLOGY.

By Professor AXENFELD (Freiburg).

Continued from p. 9.

Much greater theoretical and practical difficulties are offered, as is well known, by *bactericidal serum-therapy,* which is directed against those bacteria which do not produce free toxin capable of being bound by an antitoxin-serum in a simple chemical way. Here one has to deal with the question how the bacteria themselves are to be killed or rendered innocuous.

In consideration of the shortness of the time, I must limit myself to some statements, for full proofs of which I must refer you to my book on "Bacteriology."

Of the *Pneumococcus-serum* of Roemer and Merck, as prepared hitherto, it has been stated that it cannot fulfil the high therapeutic requirements necessary for the treatment of *ulcus serpens.* The serum possesses indeed curative properties, and may be used to *help* other treatment, especially in very severe cases. But it does not act so certainly that it can take the place of surgical treatment.

It is only justifiable to try an exclusive serum-therapy in those cases which, in consequence of their benign character, can be treated by conservative methods, and in those in which the other treatment is not capable of arresting the destruction of the cornea.

At the Ophthalmological Congress of 1907 at Heidelberg Roemer promised us a new kind of serum, which will be prepared by the use of pneumococci of high virulence for animals, while hitherto Roemer's polyvalent-serum has been based upon the injection of many varieties, obtained directly from different human pneumococcus infections.

Up to the present this serum has not been placed at our disposal; the new serum will have to be tested critically when it is placed upon the market as to whether it gives better results than the polyvalent-serum has given hitherto.

Active immunisation also, *i.e.*, the subcutaneous injection of dead cultures of *pneumococci*, has not proved sufficiently efficacious. We already possess a large experience of vaccine-therapy of ulcus serpens; it has been used in a large number of cases by Roemer and many others, and also by myself. Perhaps the result might be better if we were able to use instead of a standard vaccine a vaccine prepared with the pneumococci of the patient himself and cultivated from the ulcus serpens to be treated, as Wright has suggested. But before such a vaccine would be ready the destruction of the cornea might have increased dangerously. It would also be doubtful whether the vaccine taken from the ulcus serpens would be efficacious enough, because these pneumococci, if cultivated, often lose their virulence very quickly. Consequently, for the vaccine-therapy of pneumococcus infection of the cornea even more restrictions are to be kept in mind, as discussed above, than for the passive pneumococcus serum-therapy. Even the combination of passive serum-therapy with vaccine injection has not been efficacious enough to take the place of surgical treatment.

The action of *streptococcal-serum* or vaccine is to be considered as similar to that of pneumococcus, *i.e.*, a supplementary action may be obtained by this serum-therapy. In streptococcal-diphtheria of the conjunctiva the use of serum is to be recommended. Perhaps also several hæmatogenous inflammations of the eyeball of metastatic character may derive advantage from this serum-therapy. Boucheron recommended Marmoreck's streptococcal-serum 14 years ago in cases of acute rheumatic iritis. It is quite possible that there is a kernel of truth in this, for Poynton and Pain's investigations show that cases occur in which a general streptococcal infection is to be found.

As hypopyon-keratitis and wound infections produced by streptococci are relatively rare, we have no great experience of their serum-therapy. Rymowicz has experimentally proved the prophylactic and curative action of Marmoreck's serum, and has stated that, applied beforehand or at the time, the serum is capable of preventing inflammation of eyes operated on. These investigations need to be confirmed by other experiments.

Of *staphylococcus serum-theraphy* and its influence on the eye we know very little up to the present.

To fill up the gaps I have asked Dr. Sifvast of Helsingfors to make detailed experiments with passive and active immunisation in my laboratory on this point, with special reference to post-operative conditions. The active vaccine-immunisation by Wright's method has been of peculiar interest in the course of these experiments, because by this method we are able to treat before and after operations a patient against his own staphylococci. These researches are not yet completed.

If *prophylactic serum-theraphy* is indicated in *cases of operation on the eyeball* when there is special danger of infection and an extremely great responsibility for the surgeon (madarosis, severe blepharitis, chronic inflammations of the conjunctiva, etc., not able to be completely cured by local treatment), it will best be carried out by means of active immunisation with *vaccine* from micro-organisms which have been cultivated from the eye of the patient himself. For some organisms this is relatively easy (*e.g.*, staphylococci), but in the case of others (*e.g.*, pneumococci) difficulty may often be experienced in obtaining an effective vaccine, for these germs cultivated from the eye often display a very slight degree of virulence.

In spite of this lack of virulence before the operation such germs may nevertheless produce wound infection if they enter the eyeball.

In all cases in which it is for any reason impossible to prepare vaccines from the patient himself a standard vaccine or immunization-serum as obtainable from chemists or serum institutes is to be used. (In injecting vaccine it is generally the best to do so into the *muscles,* because from them the most rapid absorption takes place.)

The subconjunctival injection of vaccines, *i.e.*, dead bacteria, is irrational. For before it can produce any local healing effect a vaccine must first reach the organs which produce the anti-bodies (spleen, marrow, etc.); whilst, on the other hand, in the subconjunctival tissue no considerable production of anti-bodies can take place. The vaccine could act in the latter place only as an irritant, or its toxin may even increase the local affection. I wish to emphasise this point, as Darier recommended subconjunctival tuberculine injections, but I hope that this proposal may not have been followed by anyone. I fear that by this method still more severe irritation would be produced even than we have seen recently with the ophthalmo-reaction.

In the treatment of acute purulent wound-inflammations in which a rapid action is of importance, we have less to expect from vaccine immunisation. The formation of anti-bodies after injection of living or dead bacilli requires generally a certain time, which depends on the dose and virulence and on the kind of bacteria. For staphylococci the conditions of vaccine treatment are relatively favourable, also for the treatment of wound infections, since the subcutaneous injection of small doses of dead culture often produces a rise in the opsonic index even by the next day. Consequently a success like those described recently by Maddox is not impossible. At all events *small* doses will be relatively the most useful for this purpose.

In cases of acute purulent wound inflammation the passive immunization with an efficient "immunization-serum" is always to be considered as the best. But the application of this method is often impossible owing to the fact that a suitable serum of this type is not at hand; or because the sera on sale, especially those for pneumococci and streptococci are not equally effective against all varieties of these species (and this also holds good in the case of standard vaccine). In the frequent cases, where the determination of the germs is impossible, *e.g.*, in a large proportion of intraocular infections, one can only consider the possibilities of etiology, and one may therefore use a combination of two or more serum-therapies, in addition to all other possible local and general treatment.

If one or other of the non-specific sera should really prove so polyvalent that it is capable of acting at the same time against a number of different bacterial species, it would be a great advance.

In cases of violent *gonorrhœal* infection of the conjunctiva it would not be difficult to obtain in one to two days a vaccine from the gonococci of the eye. But, according to literature, one does not obtain an undoubted influence in gonorrhœal urethritis or conjunctivitis. With more prospect of success the metastatic gonorrhœal eye diseases might perhaps be treated with a vaccine; for gonorrhœal arthritis this is asserted already, especially by American authors. Thurner's serum for gonococci, used in the United States, has been lately applied by A. Knapp in a case of gonorrhœal iritis.

Roemer has proposed to produce solution and more rapid re-absorption of hæmorrhages of the vitreous by injecting *hæmolytic serum* into that body: this has not led to any practical results. To inject directly into the vitreous appears, indeed, *a priori* a questionable proceeding, seeing that such lesions of the vitreous are notoriously capable of giving rise subsequently to detachment of the retina. The hæmolytic serum is furthermore not altogether innocuous. In a case of Elschnig's it produced a powerful reaction, and the eye became blind and had to be enucleated, and it was then found that, in addition to inflammatory changes, atrophy of the nervous elements of the retina had taken place.

I will not go into details concerning the technique and dosage of von Hippel's *tuberculin* treatment, for you will find it described in the English edition of my "Bacteriology of the Eye" (translated by Macnab), and also in the detailed essay published a very short time ago by Percival Hay in *The Ophthalmoscope*. A great number of well-observed cases have been published, in which under this treatment severe tubercular diseases of the eyeball recovered completely.

In opposition to these experiences, Wright and his pupils, as you know, have pointed out that the opsonic index may be brought to, and maintained, at the highest possible degree by much smaller doses than those recommended by von Hippel, not larger than $^1/_{200}$ mgr., and that otherwise the negative phases are too long and the injection might do more harm than good. Sahli, Denys, and others have been led to a similar conclusion by clinical observations on pulmonary tuberculosis. We opthalmologists will need a special series of researches to decide the question of the dosage in tuberculin treatment. It is first to be determined whether the opsonic index can be accepted as the sole measure of this treatment and of its results. The opsonic result is only *one* of the effects of immunity, and not the sole one. It will be necessary to treat cases of eye-tuberculosis with varying doses under continuous observation of the opsonic index and the clinical course.

With regard to the extraordinary interest on the one hand, and the violent opposition on the other, with which Wright's method has met, I may be permitted to say as my own impression that for the practised worker, who knows the technique thoroughly, definite results are to be obtained within certain limits. I do not agree with the opinion that this method is worthless. It is indeed not suited to a simple clinical application, and it is questionable how far it gives a reliable estimate of immunity, as generally the signification of phagocytosis is by no means completely explained.

The few reported ophthalmic cases on which such comparative researches have been made do not justify any definite opinion. And although in my own laboratory Prof. Stock, who is well practised in the technique, has made a great number of such experiments I cannot give you definite results, it being necessary to keep the cases under observation for a very long time.

We have tried in Freiburg also treatment with very small doses; but I must say that the result has not been very encouraging, and so we have reverted for the present to a modified von Hippel treatment.

I should like to add here, without going into details, that the extremely chronic cases of tubercular uveitis, as they so often appear to us in the form of serous iritis or chronic iridochoroiditis, are in a relatively small degree influenced by tuberculin treatment. We have not yet made very great progress in the specific therapy of these forms of tuberculosis.

Here I propose shortly to touch on the *infections which are exclusively pathogenic to the eye,* especially on those running a chronic course, because vaccine-therapy has been recommended by Wright especially for local diseases which show no tendency to spontaneous recovery.

First, we shall consider *sympathetic ophthalmia:* This exclusively eye-pathogenic disease is thought at present by most ophthalmologists to be a metastatic infection, conveyed by the blood circulation. It will be remembered that zur Nedden has discussed the question whether there was a production of anti-bodies in the serum in consequence of this infection of the blood. He therefore injected the blood-serum of patients suffering for a certain time from sympathetic ophthalmia into other patients showing the beginnings of sympathetic ophthalmia, and in some cases a considerable improvement seemed to be manifested.

In my own clinic Dr. Brons made further investigations, but the results were negative, nor could we satisfy ourselves that the serum of patients with sympathetic ophthalmia had any other effect on the eye of the rabbit than had normal serum.

The prospects of this serum-therapy seemed *a priori* to be not very good. For the fact that only the eyes react to the germs of sympathetic ophthalmia renders it not very probable that these germs have any considerable influence on organs which produce anti-bodies. For the same reason a vaccine-therapy seems not very propitious, although it would not be difficult to prepare an emulsion from the uvea of the eyes enucleated for sympathetic ophthalmia. (That would correspond to an active immunisation or vaccine-therapy.) I am far from recommending this as a therapeutic agent, because we do not know at present the biology of the germs of sympathetic ophthalmia.

For the *diplobacillary infection*, which also is exclusively pathogenic to the eye, it is not worth the trouble to make trials of vaccine-therapy, because we already possess in the local application of zinc an

THE LATE DR. ARGYLL ROBERTSON.

excellent remedy for the conjunctiva and for the cornea. Nevertheless it would be of scientific interest to see if by subcutaneous injection of diplobacillary vaccine a rise in the opsonic index could be obtained, and whether any therapeutic action occurred.

I remember having once read—I do not know where—the proposal to apply vaccine-therapy also to trachoma by subcutaneous injection of an emulsion of excised trachomatous follicular tissue. I do not know if this has been done. Besides the difficulty of getting such material in a sufficient quantity it is very doubtful whether by this way any result would be obtained.

(*To be concluded*).

DR. ARGYLL ROBERTSON.

We deeply regret to have to record the death of Dr. Argyll Robertson, which occurred on the 3rd January at Gondal, India, where he was on a visit to the Thakur of Gondal.

Douglas Argyll Robertson was born at Edinburgh in 1837, his father being Dr. John Argyll Robertson, a distinguished surgeon, who was President of the Royal College of Surgeons of Edinburgh in 1848. He received his medical training in Edinburgh and at St. Andrews, and graduated in Medicine at the latter University in 1857. He then studied ophthalmology in Prague under Ferdinand von Arlt, and in Berlin under Albrecht von Graefe, and having settled in Edinburgh as an oculist, he took the Fellowship of the Edinburgh College of Surgeons in 1862. In 1867 he was appointed Assistant Ophthalmic Surgeon to the Royal Infirmary, with Mr. William Walker as his chief. In 1870 he was made co-equal with his senior colleague, and in 1882, on Mr. Walker's resignation, Robertson was given for a time sole charge of the Ophthalmic Department, and continued to hold the senior post until the time came, in 1897, for his hospital retirement, when he was appointed Consulting Ophthalmic Surgeon.

Dr. Argyll Robertson was President of the Royal College of Surgeons of Edinburgh in 1886. In 1893 he was elected President of the Ophthalmological Society of the United Kingdom, and was re-elected in 1894. He was Surgeon-Oculist in Ordinary in Scotland to Queen Victoria and to King Edward, and was member or honorary member of many Medical Societies both at home and abroad. In 1896 the LL.D. *causâ honoris* was conferred on him by the University of Edinburgh.

Argyll Robertson's contributions to ophthalmology were many, and several of them were of the first importance. They appeared for the most part in the *Edinburgh Medical Journal*. In that journal for March 1863, appeared his very beautiful paper "On the Calabar Bean as a new agent in Ophthalmic Medicine," and in 1869 and 1870 his paper on "Spinal Myosis," in which he described that condition of the pupil in certain diseases of the spinal cord, which has since then been known by his name. "Marked contraction of the pupil, which differed from myosis due to other causes, in that the pupil was insensible to light, but contracted still further during the act of accommodation for near objects, while strong solutions of atropine only induced a medium dilatation of the pupil." Truly a remarkable observation, and one which well illustrates the keen clinical insight which Robertson always displayed.

As an operator Argyll Robertson was beyond compare. He knew nothing of "nerves," and brain, eye, and hand collaborated so perfectly that it was a delight to watch him at work. His teaching, so clear, so well-arranged, was followed by a large class of students, although ophthalmology was not at that time included in the curriculum of necessary medical studies at Edinburgh.

But deeply interested, and much engaged, as Robertson was in his profession, he also took interest in less serious pursuits. He was an archer of that distinguished corps, The King's Body-guard for Scotland. He was a good sporting shot. He was fond of travel, but golf was his chief recreation, and five times he won the gold medal of the Royal and Ancient Club, and three times the gold medal of the Honourable Company of Edinburgh Golfers. To golf he attributed much of his good health and of his enjoyment of life, and it was not his experience that it had interfered with his professional success. On the contrary, he used to tell how, soon after he commenced practice, he was consulted by a gentleman on account of his daughter's strabismus. Robertson advised operation, to which the father promptly assented. At the final visit the gentleman said he supposed Dr. Robertson did not know what it was had caused him to bring his daughter to him. Robertson said he did not, and had been wondering how it had come about, for he had not even an acquaintance in the part of Scotland from which the gentleman came. "Well," said the gentleman, "I brought my daughter to you because I saw you play such a steady game on the St. Andrews links the day before our first visit. I enquired who you were, and made up my mind at once."

In 1904 Dr. Argyll Robertson gave up his practice, and retired to his pretty place, "Mon Plaisir," in Jersey. His professional friends in Scotland presented him with his portrait by Sir George Reid, and the Cap and Gown Club entertained him to a farewell dinner. Some of his friends had the intense pleasure of meeting him once more at the Sheffield meeting of the British Medical Association last Summer, when he seemed in good health, but from a casual observation made to one of his friends it was evident he felt his heart to be not strong.

We have spoken of Argyll Robertson as the original observer, the brilliant operator, the able teacher, the true sportsman, the keen golfer. But he was more. He was one who in the highest degree maintained the honour, the dignity, and the finest traditions of our profession. Scrupulous in his dealings with his patients, and scrupulous in his relations with his professional brethren, imbued with a strong sense of duty, he was in all respects upright and straightforward. His was a charming personality. Of strikingly handsome appearance, he forthwith won the favour of all with whom he came in contact by his courtesy and sympathy. But when circumstances called for it no one could be more firm, yet without offence, in maintaining what he held to be the right. A delightful companion, with a keen appreciation of humour, his merry laughter filled the air. He was hospitable and generous to a fault. And, above all, he was a loyal and most affectionate friend, and many indeed there are who were proud to be able to claim his friendship, and who will look back upon it as one of their most cherished possessions.

REVIEWS.

H. Rönne (Copenhagen). **The Field of Vision in Glaucoma.** *Klinische Monatsblätter für Augenheilkunde*, January 1909.

This article is written by Prof. Bjerrum's assistant, and therefore comes with a certain degree of authority, emanating as it does from the clinique of the observer to whom we chiefly owe our knowledge of the special features of the glaucoma field. It was in the years 1889—1892 that Bjerrum first drew the attention of the profession to certain forms of defect which had as yet escaped notice, and which could be discovered only by a considerable modification in the methods of investigation. Rönne notes that this new point has been much more readily and correctly taken up in this country than on the continent: on that account he publishes his paper in a German journal, in the hope of rendering the method more popular in that country.

As is well known here, Bjerrum's special system consists, roughly speaking, in employing a very small test object and separating patient and screen by a greater distance—usually 2M.—thus rendering the test more severe and bringing more readily to light any defects in the field, whether absolute or relative. The screen has to be large and extend from floor to ceiling in order to cut off side lights, and must be well illuminated; it should be uniform in structure, of a dull black, with no marks of any sort to "catch the eye." One does not employ this method for the peripheral parts of the field, because the minute test object employed is not visible by the normal eye beyond a limited distance from the fixation point.

If one draws through the middle point O of the screen a cross, each of whose 4 limbs is 1 M. in length, and names the extremities of the horizontal arm a and b, then to a person standing a distance of 1M. from the screen, the angular separation of a from o is 45°; if he fixes b, the separation of a from b is 90°. If he removes himself to 2M. the angular separation of a from o is 26·5° (approx.) and of a from b, 53°. This is an ample extent for a test object whose dimensions are so small as that employed. The best test objects are circular ivory discs of different sizes, which may be held in a long dull-black metal handle[1]: the minute test object is thus the only visible point in the field.

The procedure is as follows: the field is first of all taken in the ordinary way upon an arc perimeter placed in front of the screen; the test object for such being usually one of 10 m.m. diameter, and the radius of the perimeter arc being as a rule 300 m.m., the visual angle of the object may be reckoned as $^{10}/_{300}$ (in degrees $= 2°$ approx.). The arc perimeter is now removed and the patient placed at 2 M. from the screen, the chin supported on a stand. When a test object is employed whose visual angle is less than 30 minutes, the peripheral limits of the field begin to creep in; with larger objects there is no reduction; the smaller the test object, below 30 minutes, the smaller does the extent of field become. If one employs a test object of 6 m.m. ($^{6}/_{2000}$), which gives a visual angle of 10 minutes, the outer, inner, upper and lower limits of the field become 50°, 40°, 40°, and 35° respectively: with an object of 5° visual angle, from 10° to 15° of area is lost in each meridian.

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[1] In Edinburgh, as a handle, we employ, as affording no light reflexion, a flat piece of wood covered with velvet exactly the same as the screen.

There are, of course, individual personal differences, but these take the form of a uniform general enlargement or contraction, never of a scotomatous, lateral or sector-shaped defect. Neither moderate variations in daylight, nor differences in the size of the pupil have any decided influence upon the field. Any error of refraction should be corrected before the finer tests are employed, and the state of the fundus should be carefully examined.

It was by means of this method, used not to the exclusion of, but along with, the ordinary perimetry, that Bjerrum first noticed the peculiar feature of the glaucoma field; he found in a series of cases small defective areas extending from the blind spot and passing in an arc above or below the fixation point to end at the nasal side of this about the horizontal meridian, this corresponding to the course of the paramacular bundles of nerve fibres. (Fig. 1.) In other cases a narrow defective area stretched upwards or downwards curving either above or below round the fixation spot, somewhat further from it than in the cases formerly mentioned, and reaching to the periphery of the nasal portion of the field, where it merged into the blind area so well known to exist in that part of the field of a glaucomatous eye. (Fig. 2.) In such a case the test object can, with care, be conducted right from the scotomatous area in the nasal field to the physiological blind spot without ever becoming visible to the patient. The fibres thus seen to be chiefly affected are those which emerge

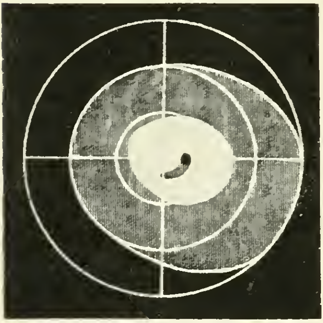

Fig. 1.

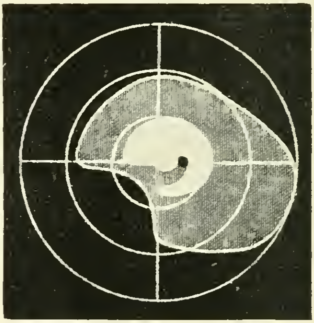

Fig. 2.

from the edges of the disc above and below to subserve the nasal and paracentral portions of the field, while those travelling inwards and presiding over the temporal half of the field, and also the macular fibres remain longest unaffected.

When the disease has made further progress and more gross defects in the field exist, the author has often found a blind area at the margin of the retained portion of field; in other cases the field has actually been divided into two portions—a small central oval area reaching outwards as far as the blind spot, and a larger temporal field, completely separated from one another by the blind spot. As the disease progresses still further one or other of these is gradually eaten up so that the patient is left either with a very small central field or an excentric temporal arc. While it may quite well be that cases of glaucoma occur in which these characteristic features are not at that time exhibited in the field, it is probable, according to Bjerrum, that in every case, whether it be early or later, these features will at one time or another be shown. He believes further that the peripheral amblyopia is due to compression of the nerve fibres at the margin of the cup and not to interference with the vascular supply by way of pressure on peripheral vessels.

While these defects in the field are very characteristic they must not be regarded as quite pathognomic however, for, since they do take their origin at the disc, other lesions of the nerve, such as neuritis, are also capable of producing them.

Rönne goes on to mention certain authors who have incidentally described cases individually in which the peculiarities above descanted upon were more or less carefully observed, before Bjerrum's paper had been published or without knowledge of it, though no general principle had been formulated: but no one—so far as we are aware—disputes with Bjerrum his claim to priority. He comments further on the fact mentioned at the beginning of this review that while Bjerrum's paper has apparently aroused little interest in Germany and is little known there, it has received full recognition in this country, and he quotes references to it from Berry, Sinclair, Priestley Smith and others. With a statement made by the last named he is greatly impressed, namely that if in a doubtful case Bjerrum's symptom is absent, the case is probably not one of glaucoma.

Along with his paper Rönne publishes 45 very typical charts of the field in cases of glaucoma, each of which exhibits in one form or another certain characters of the field as described above. The last 9 or 10 show also what may be described as a sudden flaw or break in the nasal field of vision (*der nasale Sprung*). This curious fault consists in a sudden change in the boundary line of the field at the inner side from almost vertical to horizontal along the horizontal meridian: after so running for a varying distance it again resumes its *quasi* vertical direction. As is well known it is just along or close to the horizontal meridian that the fibres which ran upwards from the disc meet again those which ran first in a downward course from it, forming a sort of horizontal raphe. On the disc these two sets of fibres are separated by those which preside over the macula, just exactly those which resist most successfully the injurious process in glaucoma, and therefore this occurrence rather helps to strengthen Bjerrum's theory as to the situation of the lesion which produces the peculiar scotomata in glaucoma.

The author says that at one time he had not realised, as he has more lately done, how common this type of field is: not always typically existent, but frequently so, and frequently suggested even if not complete. A form of this, one might almost say, is the horizontal hemianopsia which sometimes occurs, and if the fields be carefully taken it is very remarkable how often in the nasal half there is a greater failure below than above the precise horizontal level. This must be more than a coincidence, and goes to support Bjerrum's opinion as to the situation of the lesion which influences the actual form of the field.

Rönne, before the close of his paper, goes somewhat out of his way to defend himself and Bjerrum against a possible charge of having been led away into error and having involuntarily impressed upon patients the type of scotoma which they wished to discover. This seems to the reviewer (as it will certainly seem to anyone who approaches the subject with an open mind and tests his glaucoma patients not so much in order to map out the scotoma but rather to find out if it is there in the first place) quite a needless defence: as has been indicated, several good observers in this country, besides a number in northern

Europe, have adopted the method because their results have coincided with those of Bjerrum.

He agrees with Priestley Smith in urging that in the examination of the field one should not adhere to the meridional excursion of the test object, but should rather cause it to execute a circular movement with the fixation spot as centre: unless some such method is adopted the nasal "step" will never be obvious, and the other special features may readily be masked.

Rönne concludes his paper by giving tables of the results of examination by ordinary perimetry alone and by Bjerrum's method, which are calculated to show the great superiority of the latter from a diagnostic point of view. Into the details of these it is not needful to enter at present: one fact stands out prominently, however, viz., that in 87 cases in which ordinary perimetry betrayed no sign, Bjerrum's method showed a distinct lesion in 51—a warning which was confirmed in the later history of the cases. It is specially valuable in the difficult diagnosis between glaucoma simplex and primary optic atrophy.

A point regarding this method which is not mentioned in Rönne's paper may, with advantage, be here stated: it seems to be an impression in the minds of some that the application of this test involves an outlay of time which renders the method impracticable. This is quite a mistake: it is true that for the precise delimitation of a scotoma a good deal of time and patience are necessary, but for purely diagnostic purposes the test can be applied quite satisfactorily in a very brief period of time indeed. No one who has really tested the value of the method will be likely to neglect the aid which it is capable of giving in a doubtful case, even had the process been much more laborious than it is. W. G. S.

F. Lagrange (Bordeaux). **The Value of Sclerectomy in chronic Glaucoma.** *Archives d'Ophthalmologie*, November 1908.

Not long ago the distinguished professor at Bordeaux introduced his operation of sclerectomy, by which he endeavours to secure a filtration scar and so render more permanent the benefit obtained in cases of glaucoma by the performance of iridectomy. The operation suggested by Lagrange has been adopted by some surgeons. with good results in their opinion; by others it has been adversely criticised. The important article to which we now draw attention is a reply by the author of the method to some of this adverse criticism. In the first place he wishes to make it plain that his main object is not, as some have apparently supposed, to improve the actual condition of the canal of Schlemm, but to rather form a new exit for fluid, a fresh fistula of minute dimensions through which the eye can obtain relief from accumulated fluid. It should be borne in mind also that the benefit obtained from this (or any) operation is not conditioned by its relation to current or discarded theories as to the origin of the malady on account of which the operation is performed: and whether we believe in hypersecretion or in diminished excretion as being the cause does not primarily affect the question meantime, viz., the value, great or small, of Lagrange's operation. M. Abadie in particular has shown himself antagonistic to sclerectomy, to which he brings forward four objections: (1) No true fistula of the eye exists after the operation: were there such, the anterior chamber would no longer exist. (2) If a fistula did result there would be a bleb or collection of fluid under the conjunctiva where the wound was, but this is not so, for the mass remaining is nearly always gelatinous in texture and semi-solid. (3) The combined operation of sclerecto-iridectomy ought to win its spurs on cases in which simple iridectomy has been a failure. (4) It is a delicate, difficult, and dangerous operation. Lagrange takes up these objections one by one, and discusses them.

To the first point of criticism he replies that of course in one sense there is no fistula, that is, no fistula open directly to the outer air, but there is in reality a fistula, for the fluids coming from the anterior chamber are "forced" into this new-formed cyst under the conjunctiva, whence they are slowly and gradually absorbed into the general circulation, and that this collection of fluid under pressure among the elastic and other tissues of the part comes and goes, increases and diminishes, directly with the general condition of pressure in the interior of the eye. It is the conjunctival flap alone which prevents the fluid from escaping to the open air, but there is a certain difference so far as the general state of such an eye is concerned between aqueous escaping to the outer air, and the same being removed from the anterior chamber and being confined within the extramural subconjunctival tissue.

To the second objection he replies with a denial; there is just exactly this collection of fluid subconjunctivally; in a number of cases the actual communicating apertures can be seen by focal illumination. It is quite true that the aspect is not exactly like that seen after subconjunctival injection, because the quantity of fluid is quite different, and because injection is always made where the conjunctiva is loose, not where it is firmly tacked down, as it is near to and at the corneo-scleral junction. He adds that if a patient on whose eye this operation has been performed is carefully watched the amount of fluid, and therefore the amount of bulging, can be seen to alter from time to time; in fact, the patient has "attacks" of what would have been glaucoma had not the filtration scar saved him from that misfortune; and further, by a little gentle pressure on the scar one can empty the little collection of fluid partially or completely into the circulation.

To Abadie's third objection Lagrange replies that such cases do as a matter of fact exist and records of them have been published ere now. In the present paper he gives an account, hitherto unpublished, of a case in point.

The fourth objection is one perhaps a little more difficult to meet, for the operation is undoubtedly delicate and a little difficult, and the surgeon undertaking it must be expert. Lagrange states boldly that he has never encountered any really serious accident while operating by this method on cases of chronic glaucoma, and adds "of what other delicate operation on the eye could one say as much?"

The operation of sclerectomy, combined or not with iridectomy, is one which has hardly yet attained a secure position in surgical therapeutics, and it is therefore interesting and useful to read the very temperate defence of it set up by the author, which at the same time shows a resolute and reasoned confidence in its high value. W. G. S.

DEMICHERI. **Histological Examination of a Glaucomatous Eye on which Irido-sclerectomy was performed.** *Annales d'Oculistique*, September, 1908.

THERE is little need to go into the history of the case, a full account of which is given in the article, as it presents the usual features of an acute glaucoma. Palliative treatment was first adopted, but as the eye still remained painful and vision was gradually deteriorating, an irido-sclerectomy was performed under chloroform, a large scleral incision being made 3 mm. behind the limbus with a conjunctival flap ; $\frac{1}{2}$ mm. of sclerotic was resected and a large iridectomy three times the usual size was made. The operation relieved the tension, but as the pain still persisted the patient requested that the eye should be removed, and enucleation was done 15 days later.

The eye was fixed in Zenker's solution and embedded in celloidin, and serial sections were cut. These were stained with hæmatoxylin and liquid A. The histological changes were referable on the one part to the glaucoma and on the other to the sclero-iridectomy. The latter only will be summarized here.

In the neighbourhood of the sclero-iridectomy wound the histological appearances differed according as the sections passed through the central or more peripheral parts of the incision. In the central part corresponding to the vertical meridian the posterior bevelled part of the sclerotic was surrounded by the short stump of the iris which remained after the iridectomy. The anterior part of the sclerotic from which the small piece of sclera had been excised was rounded, and the fibres there were a trifle dissociated. Between the two ends of the sclerotic there existed a little cord of atrophied iris and behind the latter a layer of cellular tissue continuous with the lax and œdematous tissue of the cystoid cicatrix. The cystoid cicatrix was raised above the surface and was composed of vascularised œdematous cellular tissue with cystic cavities. In this tissue were numerous pigmented cells, which must have emigrated from the iris and seemed to have been carried there by a current. They were all arranged in a direct line between the iris and the centre of the cicatrix. There seems to be no doubt, from a study of this region, that there was a true filtration of aqueous from the anterior chamber towards the subconjunctival cellular tissue. No communication could be seen to exist between the anterior chamber and the sub-choroidal space.

Sections taken from near the extremities of the incision showed a true enclysis of the iris, which occupied the greater part of the space between the ends of the sclerotic, completely closing the cicatrix. The cystoid character of the scar was little marked ; what filtration had taken place here had extended from the central part of the incision, and had not come direct from the anterior chamber.

Lagrange has stated with regard to his operation that the filtration cicatrix, the result of sclero-iridectomy, is free from all adhesion to the uveal tract, and that the cystoid cicatrix is, on the contrary, always consecutive to an enclysis of the iris. These statements the author thinks are mere speculations, and histology alone will definitely settle the question. In concluding, the author thinks that the true scleral fistula does not persist for any length of time after the operation, the wound fills with cellular tissue which is a proliferation not only of the sub-conjunctival but also of the iritic tissue. In the author's case the enclysis of the iris did not extend outwards to more than half the thickness of the sclera. He also thinks that a cystoid cicatrix such as existed in the above case is far from being dangerous, as a broad layer of cellular tissue exists between the enclosed iris and the surface; nor does he think that the sclerosis of the tissue filling in the wound in the sclera, which occurs as this becomes older, would completely suppress the filtration. Time and clinical experience of the operation, however, will alone settle this point.

J. Burdon-Cooper.

Dransart and Famechon (Brussels). **Miner's Nystagmus.** *Bulletin of the Belgian Royal Academy of Medicine.* 1908.

The two authors have produced a very valuable contribution to the study of this singular disease, and have brought forward certain points which are more or less new and deserving of attention.

Thus they consider that nystagmus is to be regarded both as a cause and as a result of injury in certain cases. Not only is the nystagmic eye more liable to injury, in their opinion, but the injury once done there is less facility in healing: an ulcer, for example, being apt to be rendered worse and more intractable by reason of the constant movement, for the re-formation of epithelium and the consolidation of the cicatrix are thereby delayed. So far as nystagmus being the consequence of traumatism is concerned, the authors draw attention to the recognised fact that the symptom is apt to become worse as the result of intercurrent affections, and they go on to affirm that this is also true both in respect of aggravation and of commencement as the result of even trifling injuries of the eye and its neighbourhood. The patient in such a case has been the subject previously of "latent nystagmus." However doubtful this may seem, there is apparently little question that at least great aggravation of the symptom may follow upon even slight local injury. It is obvious that if this is really the case then even a most trifling injury may involve a large sum for compensation, for the patient may assert, and that quite honestly, that up to the moment of receiving the injury he had no nystagmus, or not sufficient to prevent work, whereas after it, though the actual lesion may have been very unimportant and recovery from it been very rapid, nystagmus sufficient to incapacitate him permanently (or temporarily) has come on as a definite consequence. Of course there is another sense in which nystagmus is an "accident of work," without the occurrence of any trauma at all.

In regard to this "latent" nystagmus, it has been recognised for a comparatively long time now, and has been remarked upon among others by Snell in this country and Nieden in Germany. Thus, for example, a miner may present himself on account of some totally different malady and be found to have nystagmus which is causing him little or no inconvenience, while on the other hand a man may complain of the *symptoms* although it may be only with the greatest difficulty (if at all) that any objective oscillation can be proved to exist. In such cases putting the patient in his attitude of work, causing him to turn the head suddenly, or, as suggested by Nieden, reducing the illumination greatly, will often bring on the objective sign. The condition acquires a new significance, then, in the light of recent legislation in this country.

N.B.

Another point of some moment, too, is that nystagmus by lowering the visual acuteness and by interfering with the precise "orientation" may be a cause of injury to the patient himself or to his fellow workmen.

In the interest of space we have only touched on some of the important points raised in this paper. W. G. S.

Percy Fridenberg (New York). **The Teleology and Interpretation of Nystagmus.** *Annals of Ophthalmology*, October, 1908.

We confess to having approached this paper with a dictum of the late George H. Romanes uppermost in our mind: "Science is essentially a department of thought having exclusive reference to the Proximate. . . . In so far as Science ventures to trespass beyond this, her only legitimate domain, . . . in that degree has she ceased to be physical science, and become ontological speculation."

When we read in the opening sentences that it is not the purpose of the paper to contribute to the theories regarding the "pathology or mode of development" of the movements of nystagmus we feel that there is metaphysics, if not rocks, ahead. We are not disappointed, for we are at once introduced to "a metaphysical consideration," viz., "the conception of ocular fixation as a function of dual significance to the sentient individual." Translating the author's words into plain language, this function serves the purpose, as physiologists have long recognised, of enabling us to see objects distinctly and to tell us where we are. We find ourselves in complete agreement with him when he says: "Any modern study of nystagmus must take into consideration not only the visual but the equilibrational aspect of this very involved and interesting question." This is precisely the point urged in a recent article in this Review (June, 1908). The author's main thesis, he tells us, is to establish the fact of "two main types (of nystagmus) which differ widely, not only in their evidential features, but in their mode of development, nosological significance and psychological bearing."

Here therefore is to be an attempt at an antithesis. There is nothing so irritating to an accurate mind as a false antithesis (not even a false synthesis), even when concealed under a plausible attempt at classification: hence we proceed to examine closely the author's further statements. "These two forms," he goes on to say, "represent characteristic and superficially similar disturbances of ocular motility; but they can best be understood as anomalies—the one, of macular fixation, and the other, of eye motion for direction, ideal or actual, and, mediately, of subjective position, and of objective space."

Under the first form he places what is roughly called "congenital" nystagmus, *i.e.*, dating from birth or soon after: and with his view that this is due to "non-development of the fixation faculty" observers are agreed. But we cannot see that he takes us any further towards an explanation of these undulatory movements about a fixed point. To find analogy between them and the movements of the tentacles of some marine animals does not help us far.

Under the second form of nystagmus the author describes the rhythmical twitching such as is met with in labyrinthine disturbance, with which (largely owing to Barany's work) we are already familiar. This he calls "directional nystagmus": it amounts to "a clonic spasm of fixation": it "corresponds exactly to the muscular adjustment of the eye in fixing objects in progressive motion through space." Now we fail to see, though realising its convenience, the essential nature of the distinction between these two forms: we have previously sought to show that Barany's distinction of "ocular" and "labyrinthine" nystagmus is not an absolute one. So here, as the attempt at fixation enters into both, Fridenberg's two forms are not mutually exclusive, and the antithesis is in a large degree false. If he reply that in his first form there is no attempt at fixation then we would rejoin that this is true only of yellow spot fixation. The movements are clearly designed to keep the eyeball in the position of equilibrium, *i.e.*, of equal tension in the extrinsic muscles.

But that the author cannot abide by his own distinction, we think is evident when he says, "the symptomatic significance of fixational nystagmus" (which we take to be his first form) "depends on its strikingly directional quality."

We note that in connection with miners' nystagmus (which we think he has not closely studied) he repeats a statement to which by no means all colliery surgeons would assent, viz., that it is due in part to "prolonged forced position of the eyes": such, we maintain, has not yet been demonstrated.

We are unaware that, as stated in a footnote, Snell has recently advanced a theory of the labyrinthine origin of miners' nystagmus.

On the whole the paper is disappointing. We feel that much more must be understood of rhythmical movement in muscles, of rhythmical discharge from nerve centres, and of the possibly alternating nerve discharge to antagonistic muscles, before we can get further light on the causes of nystagmus.

A. Christie Reid.

Frenkel. Recurrent Hæmorrhages following Iridectomy.

Recueil d'Ophthalmologie, September 1908.

The case was that of a woman, aged 68, in whom, after iritis, each pupil had become almost occluded. The family history was good: she had had eight children, no miscarriages. The vision in each eye had become worse during the past six months. The lids, the lacrymal passages, the conjunctiva and cornea, were natural. The anterior chamber was somewhat shallow in each eye. The pupils were contracted, regular: neither acted to light or to accommodation. The pupillary areas were occupied with a greyish exudate. Repeated instillations of atropine produced no change in either pupil. The fundi were invisible. The vision amounted to counting fingers at one metre, in each eye. The tension was normal. Active inflammatory signs were absent: no ciliary injection, no photophobia, no lacrymation. An optical iridectomy was performed upon the left eye, which was uncomplicated. On the following day, when the eye was dressed, it was noted that a large hyphæma was present, for which atropine was ordered. The next day, the eye was painful, and on examination the hæmorrhage was seen to be greater, the blood now filling half of the anterior chamber. The atropine drops were changed to eserine. The cause of the hæmorrhage being apparently inexplicable, further inquiry was made into the history of the patient, then it transpired that she was suffering from an advanced epithelial growth of the uterus, which was an inoperable one. Despite treatment for the uterine neoplasm, the hyphæma remained, and no absorption of the blood had occurred at the time the last note was taken.

The author attributes the cause of the hæmorrhage to the absorption of toxic products arising from the uterine growth. He alludes to a case recently seen in Galezowski's clinique of a man in whom the same result occurred after an iridectomy for glaucoma. In this case the patient was suffering from diabetes. Thus, he adds, when hyphæma occurs after an iridectomy, and shows no tendency to undergo absorption, the cause must be looked for in some dyscrasia, such as that of diabetes or cancer.

PERCY DUNN.

WEEKERS. **Iridectomy in Hæmorrhagic Glaucoma.** *Archives d'Ophtalmologie*, October, 1908.

IN this paper the author gives particulars of a case of a woman of 52, with moderate arteriosclerosis, in whom, after premonitory attacks of about a year's duration, an acute attack of glaucoma developed in the left eye. On examination the following day the vision was reduced to perception of light, and the visual field considerably contracted. The tension was plus one. In the right eye the tension was normal, as also the visual field. Vision in this eye was 5/9. Numerous small retinal hæmorrhages were present, and there was also exudation into the vitreous.

Two days later the patient returned with an acute attack in the right eye, which had started the previous day. Vision was now reduced to fingers at one metre. A double iridectomy was performed the same day under local anæsthesia, without being followed by any hæmorrhage. Two months later the vision in the left eye was 5/12, with contraction of the inner part of the field; while the vision in the right eye was 5/7·5, with a full field. The author insists on the necessity of using the keratome in such cases in order to avoid a large wound and to lower the tension as slowly as possible.

After briefly noting some of the theories that have been formulated on the subject of hæmorrhagic glaucoma, the author points out that on clinical grounds we have at the two ends of the scale two totally different types of case. At the one extreme are such cases as that just described, in which the existence of a certain amount of arterio-sclerosis determines the rupture of certain retinal arteries, but in which there is no extensive arterial disease of all the ocular vessels as we find at the other extreme, in such cases as those following albuminuric retinitis. He points out that it is only in the former group of cases that iridectomy is likely to prove of value. He would advise iridectomy in those cases in which the retinal hæmorrhages are not very numerous or large, and in which there is no considerable congestion of the iris or hyphæma. Even with these limitations we are inclined to think that the prudent surgeon will do well to make a careful trial of general treatment, followed, if that fails, by sclerotomy, before having recourse to such a desperate measure as iridectomy usually proves, in spite of isolated successes.

E. E. H.

M. S. Mayou (London). **Diseases of the Eye.** *Oxford Medical Manuals.* Henry Frowde and Hodder and Stoughton. 1908.

This latest addition to the large family of handbooks on diseases of the eye does not differ in any very marked way from its competitors for popular favour. It follows, as it must of course follow, the familiar lines, and does not dwell at undue length either on refraction or on "ophthalmoscopic diseases." It consists of some 400 pages, which have the merit of being less crowded, and therefore more easy and pleasant to read than is the case with some other books of a similar class. Perhaps Mr. Mayou is strongest in the pages which deal with the bacteriology of the eye, but is he right in saying (p. 78) that the Koch-Weeks' bacillus is the commonest cause of purulent ophthalmia? Should this not be muco-purulent? He commits himself also to the statement that Morax-Axenfeld conjunctivitis is "extremely contagious" (p. 76): is this correct? Talking of these matters, Mr. Mayou constantly writes: "Koch-Week's" as though the latter observer's name were Week, not Weeks. His English, moreover, is careless in a number of places; for example (p. 17), "Arterial reflex, or silver-wire arteries, appear as white lines along the vessels;" this is not an isolated instance by any means, and in such a book as a text-book on ophthalmology, written by a man of culture, these blemishes ought not to occur.

We are sorry to note further that the author, when dealing with accommodation, completely confuses range and amplitude —two essentially different things the distinction between which it is of the greatest importance to impress upon the student. For the rest, the little volume is a sound, useful, compact book, written in a terse (sometimes rather too terse), plain, clear style, and is calculated to be of good service to a student and to hold its own with its numerous rivals.

Royal London Ophthalmic Hospital Reports, xvii, 3, 1908.
London: J. & A. Churchill.

The standard of excellence in these valuable reports is well kept up in this issue, the individual papers in which are three in number. The first of these is the final portion of Mr. Nettleship's exhaustive treatise on retinitis pigmentosa and allied conditions, the matters chiefly dealt with being the heredity of the true disease and also of congenital night blindness apart from genuine retinitis pigmentosa. It is almost needless to say that this contribution is a most valuable one.

The second paper, by Mr. Hancock, deals with the fields and fundus changes in obstruction of the central artery of the retina. The special point to which attention is given is the existence—which may be present from the onset or may appear later—of a portion of the field in which some vision is present, even in cases of apparently complete obstruction; the portion of field retained or regained is almost always to the outer side. He suggests that the explanation may be that a partial nourishing of the extreme anterior limits of the retina by the choriocapillaris is the normal rule and that the nasal portion of the retina is the best developed towards the periphery of any of the circumferential regions. A second point has relation to the nature of the so-called œdema of the retina which comes on: he considers that this ought rather to be regarded as a coagulative necrosis.

The final paper is a very useful one dealing with the pathology of cases of retinal disease with massive exudation, cases which clinically may present very serious difficulty. It is from the pen of Mr. George Coats.

Pechin and Ducroquet. **The Rôle of Writing from the Ophthalmological and Orthopaedic Standpoint.** *Archives d'Ophtalmologie*, August, 1908.

No one who has inspected a large number of school children will doubt that it is the writing lesson which is mainly responsible for the bad habit of stooping with the head almost touching the desk so often acquired. Desks and seats unsuitable to the height of the child are probably the most general cause, but even with proper desks and seats and good lighting the tendency to stoop may be difficult to overcome. The method of holding the pen, and particularly the position of the paper in relation to the plane of the body, must also be considered. Two methods of writing have been advocated, one the upright script, in which the writing paper is placed square with the body, and the other the slanting script, in which the paper is placed in a sloping position, the right hand top corner being above the left. The present article is a plea for this slanting script, which is indeed the natural and usual method of writing, but which seems to be in danger of being displaced in the French elementary schools by the upright script.

The main point is that the upper part of the body should be supported on both elbows, which should rest stably on the desk; otherwise the body will become twisted and as soon as the slightest fatigue begins to tell the head will inevitably drop down towards the desk. Now with the slanting script the right elbow forms a stable fulcrum for the fore-arm as the latter moves from left to right, and therefore the right elbow takes its proper share in supporting the body. But with the upright script the right elbow necessarily travels along to the right and can therefore no longer afford a stable support. It is hardly necessary to look at the illustrations with which the article is furnished to convince oneself that this is true. The moral is that school inspectors ought to insist on the adoption of the slanting script in all schools as a precaution against the prevalence of school myopia.

A. H. T.

E. Jackson (Denver, Colorado). **The Ophthalmic Year Book.** Vol. v, 1908. Denver: The Herrick Book Co.

Our American Editor, with the assistance of de Schweinitz and Würdemann, continues his work of producing a year book dealing with the literature of the previous year. Thus the present issue has reference to the publications of 1907. The whole production is a marvel of industry well applied, and is a great testimony to the living interest in his work felt by our distinguished colleague, and to his diligent search through the current literature for items of interest. The new volume of 360 pages is as successful as the former have been, and nothing of moment seems to have escaped the Editor's searching glance. The Ophthalmic Year Book is a most valuable production and deserves the support of the profession.

Spilios Charamis (Athens). **Were Glasses known to the People of Antiquity?** *Archives d'Ophtalmologie*, October, 1908.

The author, in a somewhat playful paper, refuses to acknowledge that there is any reliable evidence of the knowledge of the use of spectacles before the time of Gordon, 1305. The word *διόπτρον*, relied upon by other authors to show that spectacles were known to the ancient Greeks, should be understood to mean a mirror, and as for Nero's famous emerald, the proper explanation is the one given by Pliny that the emerald by its colour charmed the view. Glass and the action of convex lenses in condensing the sun's rays to light fire were known to the Phœnicians. Seneca states that fine writing was magnified when seen through a water bottle. The invention of spectacles has been accredited to Bacon, and finally in a tomb in a Florentine church is an inscription claiming a certain Armati di Firenze, who died in 1317, as the first spectacle maker. According to Pansier the said Armati di Firenze was only a simple glass worker who improved the methods of manufacture, and so extended the use of spectacles. The author concludes that the earlier forms of spectacles were undoubtedly very imperfect, but that whoever the inventor might be, he should be considered one of the great benefactors of the human race.

E. E. H.

Gaupillat (Chalon-sur-Saône). **The Treatment of Purulent Conjunctivitis of the Newly-born.** *La Clinique Ophtalmologique*, 10th Sept., 1908.

Dr. Gaupillat, having read in the *Journal des practiciens* an article by M. Rochon-Duvigneaud advocating the use of silver nitrate in ophthalmia neonatorum, objects first to the publication of such a paper in such a journal and secondly to the advocacy of the use of siver nitrate by general practitioners.

There are, says he, three kinds of ophthalmia neonatorum: the first appears between the 2nd and 3rd days after birth; the second, between the 3rd and 5th days; the third, between the 5th and the 10th days. The first form is extremely grave and in no way comes within the province of a general practitioner to treat—instill argyrol (20%) every hour day and night, and at once send the patient to an oculist. The treatment of the second may be attempted but if on the 2nd or 3rd day there is no improvement give the patient an injection of Roux's serum and call in an oculist. The third form will always be cured.

As regards the treatment Dr. Gaupillat has no advice to give to experienced specialists but would suggest to young oculists the following procedures: (1) Once or twice a day swab freely with permanganate of potash, 1 in 50 to 1 in 10, (2) Follow with a thorough flushing out with permanganate of potash 1 in 4000 at a temperature of at least 40° C (104° F.), (3) Instill argyrol (dissolved in the cold) every hour. If in spite of this, a corneal abrasion, ulcer, etc., appears, no matter how slight it may be, touch it with the same potassium permanganate solution and inject Roux's serum. If the case does not improve after 2 or 3 days, if the upper lid is swollen and rigid, think of diphtheritic conjunctivitis: inject Roux's serum freely and instill 5 or 6 times a day crude petroleum (Vian, of Toulon).

FRANK C. CRAWLEY.

THE MINIMAL VISION REQUIRED BY DRIVERS OF AUTOMOBILES. —A Committee of the French Ophthalmological Society has recently reported on this question and suggested for discussion a recommendation that such men be required to possess

1. Vision in both eyes.
2. A minimum of visual acuity of 0·2 in each eye without correcting glasses.
3. A full field of vision, and perfect mobility of the eyes.

In discussing the recommendation M. Morax said that some of his colleagues were disinclined to interfere with the liberty of the subject in this matter. He himself would grant that it could not be shown from the record of automobile accidents to what extent bad vision had contributed to their occurrence; nothing was said on the point. He would divide drivers into two classes: (1) Private owners who were their own drivers. (2) Drivers in the employ of transport companies. Those of the first class were probably always insured, and it rested with the insurance companies to protect themselves; he believed the matter was being considered. The second class of drivers had to pass some examination before entering employment, and their opinion would be desired as to what tests should be employed.

In order to obtain an unanimous recommendation, he would suggest the formula: The society considers that risks of accident arise from bad vision in drivers of automobiles.

M. Terrien suggested that: For the reduction of these risks drivers be required to possess the sight of both eyes, a full visual field, and full mobility of the eyes; while M. Sauvineau proposed the addition of the requirement: That in case of diminution of visual acuity the driver be required to possess a minimum of 1/2 for one eye and 1/4 for the other eye with correcting glasses.—*Recueil d'Ophtalmologie*, March, 1908.

XITH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY.

Naples, 2nd to 7th April, 1909.

We are asked to intimate that an effort is being made to arrange special terms for travelling expenses and hotel accommodation for the benefit of those who may wish to attend the above Congress. We have also to remind our colleagues that it is proposed to issue for perusal before the Meeting the Communications which are offered for discussion at Naples. These will be sent to those *only* who have signified their intention to be present and have *paid the Congress subscription in advance.* (The subscription for each member is 25 francs: for any individual member of his family accompanying the member, 10 francs.) To facilitate these arrangements it is most desirable that those who wish to attend should make the earliest possible intimation to one of the Corresponding members for Great Britain and Ireland—Dr. Walter Jessop, 73, Harley Street, London, W.; Dr. George Mackay, 20 Drumsheugh Gardens, Edinburgh; or Sir Henry R. Swanzy, 23 Merrion Square, Dublin.

SERUM-THERAPY IN OPHTHALMOLOGY.

By Professor AXENFELD (Freiburg).

Continued from p. 39.

NON-SPECIFIC SERUM THERAPY.

But many of you may perhaps impatiently ask: " What is the use of spending so much trouble on all these different separate species of bacteria? Do not we hear with ever-increasing frequency that this is quite unnecessary, since, by means of " non-specific serum-therapy " we get (so at least say some, especially Darier and Deutschmann) quite as good, or better, results than with the specific anti-bacterial serum-therapy? The anti-diphtheritic, the anti-tetanus, the yeast-serum and many others act, they say, against all kinds of infections." *But do the non-specific serum-therapeutics in reality do so?* This "*non-specific*" *serum-therapy* is perhaps for many so much the more attractive, since the theory of specific immunity (into which of course I cannot here go deeply) is in many respects at present in process of transformation and a subject of animated discussion, the result of which seems to be that the process of anti-bacterial immunisation is by no means completely explained by the hitherto ascertained specific effects.

We will take up this new subject of " non-specific " serum-therapy, because it will give me the opportunity of making a few remarks on the methods of proof to be employed. I have, first of all, to avoid any injustice, to point out that the partisans of non-specific serum-therapy do not deny the specific nature of antitoxin and of the other specific anti-bodies. They admit also that they have the greatest affinity to the corresponding infections. But according to their opinion the serum, which has been prepared with a certain toxin or a certain bacterium or with yeast, contains in addition still other active qualities; and some authors go so far as to attribute the whole therapeutic effect of streptococcic sera, pneumococcic sera, and others, not to the very insufficient *specific*, but to the *non-specific* stimulating properties (a conception which is not proved).

Talamon already immediately after the discovery of anti-diphtheritic serum by Behring, began to treat pneumonia and other infections with the serum. Predtetschensky, following up Mentschikow's teaching, maintains that anti-diphtheritic serum contains "stimulines," *i.e.*, substances which stimulate the leucocytes to increased activity, as notoriously certain other substances do, *e.g.*, certain concentrations of nuclein acid, etc., and to a smaller extent also normal horse-serum.

So far as I know, there is at present no sufficient proof that anti-diphtheritic serum has any more considerable stimulating effect on the leucocytes; with regard to the staphylococcus aureus, Neisser could not obtain increased phagocytosis in comparison with the normal horse-serum. This question must be tested by means of further investigation.

Peabody, Rosenberger, Randle, Pemington attribute to the anti-diphtheritic serum an "antagonistic" effect on meningococci similar to the injury to their growth in nutritive media experienced by some microbes, in consequence of the presence of other germs.

According to Darier the injection of such strong toxins as the diphtheritic or tetanus toxin excites all organs of the animal to the production of anti-bodies of all kinds and not merely to the production of diphtheric and tetanic antitoxin, and this makes the serum effective in all kinds of infecions. The action of these sera thus seems to be similar to that of the familiar dietetic treatment: the body is strengthened and its resisting power enhanced.

It would lead us much too far afield to discuss all the theories formed to explain the alleged effect of these non-specific sera. We can here only state that all these theories leave the question whether anything is to be attained in the eye in this manner quite open. We have to ask ourselves what proof we at present possess of the efficacy of these "non-specific" serums in eye diseases? If Darier's and Deutschmann's views are correct this non-specific effect even surpasses to a marked degree that of many of the specific sera hitherto used. Deutschmann maintains that a progressive ulcus serpens was arrested by his yeast-serum; he and his partisan von Hippel therefore declare the galvano-cautery to be unnecessary in the majority of cases. Von Hippel says categorically that the results with Roemer's anti-pneumococcus serum are quite inferior to those obtained with yeast-serum, even in pneumococcus infection. Deutschmann even describes his serum as being efficacious in cases of wound-infection extending into the vitreous. He reports a case in which the infiltration of the vitreous subsided after the injection of the serum; again it developed when this was discontinued, and disappeared definitely after a new dosage with serum. Such a wonderful effect had never been previously obtained in serum-therapy.

In a recent number of the *Münchener Medizinische Wochenschrift* Deutschmann cites a case of Schwabach, in which an orbital infection healed under this treatment, and a case of severe purulent metastatic gonorrhœal ophthalmia which healed in an astonishing manner.

Some statements of Darier and others on the non-specific effect of anti-diphtheritic serum are just as astounding. What a great step forward it would be if it were to be confirmed! Only think: it would be quite unnecessary to determine the special etiology of any infection!

Turning now to criticisms on what has been recorded above, I may remark that clinical observation on human subjects must always speak the decisive word, although by it no mathematical certainty can be obtained, and although something of subjectivity always clings to it. But in many infectious diseases the varying character of the epidemics, and also of the individual cases, renders it difficult to judge whether a particular remedy has had any effect, and if so, in what degree. I need not tell you that eye infections offer in this respect a difficult task. Assuming that the sera in question possess a healing power against *ulcus serpens corneæ,* then we have to ask: Is this action so great and does it occur with such regularity as to justify us in dispensing with the surgical treatment, and especially with the galvano-cautery? To justify the use of serum *alone* to the exclusion of surgical treatment in this dangerous disease, which often takes so unaccountable a course, it is not sufficient merely to prove that the serum possesses curative power, but to show that it has a sufficiently high degree of this power.

One must specially avoid making the general practitioners over-confident, and prematurely allowing them to think that they now possess a reliable remedy for the treatment of *ulcus serpens.* It has already been maintained in Darier's periodical that this is the case with anti-diphtheritic serum, and von Hippel's paper on Deutschmann's Yeast-serum (v.s.), and Deutschmann's own statements might lead to a similar conclusion with regard to it.

In regard to this responsibility it is indispensable to have recourse to experiments on animals as a check as far as possible. Here we can reach an incomparably higher degree of accuracy, by means of exactly graduated infections of the different parts of the eye and by comparison with untreated animals which have received the same quantity of infective matter.

The results obtained from animals cannot be transferred without restriction to man. But for many infections there is so great a similarity in the morbid appearances and the reactions that the experimental results may be of the greatest clinical value.

It is possible indeed that a result which we do not obtain in animals may nevertheless occur in the human body. But in such a case we should exercise the greatest reserve in forming an opinion of the therapeutic effect of a serum-therapy.

If now we consider the publications on the alleged non-specific curative action of anti-diphtheritic serum on the various eye infections it must be considered as a defect of Darier's work that absolutely no experiments on animals' eyes have been carried out to test and control his observations made on man.

I had experimental tests of this question carried out in my laboratory by Dr. Happe and Dr. von Szily. Rabbits, previously immunised and also treated daily after infection with relatively large doses of Behring's or Roux's serum, received accurately measured minute quantities of dilute vibration culture (Schüttelcultur) of staphylococci or pneumococci, injected with a very fine cannula into the vitreous, the anterior chamber or the cornea. A control rabbit was always infected in exactly the same manner. These extensive series of experiments had a completely negative result, for the animals treated showed the same symptoms as the untreated. Without going into details I should like to mention that treated animals, when injected in the vitreous with pneumococci not only developed panophthalmitis, but even died in a few days, exactly as did the control animals. That is, the serum did not exhibit any influence against either local or general infection.

I should like to emphasise once again that I do not regard the question as solved for the human subject by these experimental results. But they at all events point to the necessity of exercising greater reserve, the more so as even the clinical observations published by Darier and others are by no means convincing.

On Deutschmann's serum, prepared from horses which have been fed on yeast, experiments have been made. Deutschmann briefly reports that by feeding with sterile yeast (Dauerhefe), and also by the subcutaneous injection of the serum from animals similarly fed, he has observed a very favourable influence after infecting the anterior chamber of rabbits with staphylococci, streptococci, pneumococci, or tubercle bacilli, and this was especially marked in the pneumococcus infection.

Deutschmann carried out his experiments in the following way: He placed a small quantity of culture between two small sterile gelatine plates and introduced them by means of a corneal incision into the anterior chamber; he thinks this a good method of regulating the dosage. This method, however, does not in reality afford a means of accurately comparing the dosage. It is absolutely impossible to transfer to the gelatine precisely equal quantities of culture by means of the needle or platinum loop. Differences of many thousands of bacteria are possible and unavoidable. These experiments are consequently quite unconvincing.

My assistant, Dr. Happe, has undertaken an extensive series of test experiments, both on yeast-fed animals and on animals subcutaneously injected with Deutschmann's serum, applying the same method used by him in his other experiments on the non-specific serum-therapy with anti-diphtheritic serum, which have been already mentioned.

The result of these experiments which we made in Freiburg, have been as follows: Neither infections of the vitreous, nor those of the anterior chamber, nor of the cornea showed any appreciable effect as the result of the yeast treatment on either the severity or the course of the disease.

On no occasion, not even when administering the very smallest dose of bacteria, have we been able to prevent the occurrence of the inflammation as Deutschmann claims to have done.

This has convinced us that Deutschmann's fundamental experiments on animals are incomplete and misleading. There is no question of any "extremely favourable result" (*überaus gunstige Beeinflussung*) as Deutschmann stated. This conclusion is in no way affected by the fact, that M. Neisser has recently discovered that Deutschmann's serum *in vitro* stimulates somewhat the action of leucocytes against staphylococci, thus increasing phagocytosis. This certainly very interesting and proves that the serum does really possess certain immunizing properties. But it is far from proving that this serum has a sufficient curative power on *eye* infections. We have already stated, that it is not the case in rabbits' eyes. Whether it is so or not in human eyes remains to be proved. I have already referred to the papers of Deutschmann, Schwabach, and von Hippel reporting good clinical results. But on the other hand, just as I was finishing my manuscript on this subject, the report of the last meeting of the Berlin Ophthalmology Society reached me for publication in the *Klinische Monatsblätter für Augenheilkunde,* in which Napp and von Michel warned their hearers against this remedy.*

We, therefore, are face to face with an open question. And however glad we should be to have such an efficacious remedy at our disposal, we must as yet exercise the greatest reserve in forming an opinion on it.

Up to now, following the high traditions of Pasteur,

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*In my own clinic we had negative results with Deutschmann's serum.

Koch, and many others, a very high standard has been maintained in serum research, in demanding accurate experiments as a basis of theory and practice. The same standard has also been required in ophthalmology.

I believe that it is time to raise a note of warning, lest this standard should be lowered. The existence of some experimental results obtained on other parts of the body is not sufficient for us, we must have experiments on the eye itself.

So far as it is possible, we shall still have in the future to determine the species of germs in all infectious cases in which serum treatment is to be used, in order to use that kind of vaccine or serum which corresponds best to the special etiology. That must be demanded also for this reason, that only in this way can we supplement our knowledge of the important question, as to how far the different kinds of bacteria are influenced by different methods of serum-therapy. Even if the non-specific serum-therapy should fulfil all the promises made in its name, nevertheless the determination of the germ, so far as possible, would still remain indispensable.

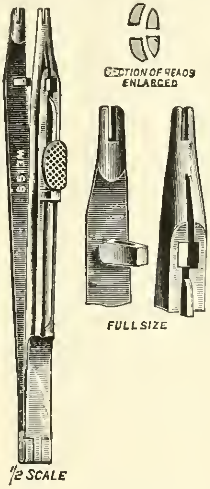
ERRATA.

p. 2, line 24—*for* "autotoxic" *read* "antitoxic."
p. 2, line 26—*for* "autotoxic" *read* "antitoxic."
p. 3, line 31—*after* "adjunct" *insert* semicolon instead of comma.
p. 5, line. 6—*after* "cases" *insert* "of conjunctivitis."
p. 6, line 1—*for* "Hoecht" *read* "Hoechst."
p. 7, line 11—*for* "autotoxic" *read* "antitoxic."
p. 8, line 11—*for* "jequiritol" *read* "jequirity."

THE BARDSLEY NEEDLE HOLDER.

This needle holder was designed for the purpose of holding securely small curved eye needles without risk of breakage; while fulfilling this object it also has two other merits, viz., handiness in use and simplicity in parts for sterilization.

The extreme annoyance caused by the breaking of a needle, say in the middle of an advancement, has been experienced by every ophthalmic surgeon, and various have been the attempts to avoid this unpleasantness. Soft lead plates at the end of the needle holder have been tried with the idea that the lead would adapt itself to the curve of the needle. Fixed curved plates have been used, but these obviously only fit one size of needle, and at least four are used in eye work.



In this holder the attempt has been made to meet the varying curve:

1. By a two-point grip instead of a continuous broad hold;

2. By a concave curve on the lower blades and a convex curve on the upper ones;
3. By bringing the upper blades slightly closer together than the lower ones;
4. By conferring a slight spring on the upper blades.

Another frequent cause of broken needles is the spring lock of most holders; the needle is especially liable to be snapped at the moment that the surgeon is putting pressure on the spring to release the needle.

In this holder spring control is replaced by a graduated cone clutch. This can be shot in and out without any increased pressure on the needle, while the tension on the needle can be adjusted by the sympathetic touch of the operator.

The needle holder is made of a length to fit comfortably in the grip of the hand, with the clutch situated well forward under the thumb.

For sterilization purposes the instrument takes into three parts.

This instrument is being manufactured by Messrs. Weiss of Oxford Street, and has already been adapted by them for use with large curved needles at the desire of several general surgeons.

REVIEWS.

L. Bach (Marburg). **The Pupil: Anatomy, Physiology, Pathology, Methods of Investigation.** 1908. Berlin: S. Karger.

This comprehensive work of 286 pages covers practically the same ground as that of Bumke published four years ago (reviewed in *Ophthalmic Review* for 1905, p. 180). Of the many questions raised, however, the answers to comparatively few can be considered final. Among them, those that have to do with the anatomy of pupil-innervation have a prominent place.

Where are the organs in the retina that receive the light rays that give origin to the pupillary reflex? According to Hess they are confined to a central area with a radius of not more than 3 mm. If this is so the phenomenon of hemianopic pupil reaction would be scarcely possible. What fibres convey the light reflex in the optic nerve? According to Westphal it is the larger fibres in the optic nerve. He found that these fibres receive their medullary sheath at an earlier period than the small, presumably visual ones. Clinically the point is of some interest, for though, as a rule, the pupillary fibres suffer from the same causes and in the same degree as the visual fibres, sometimes the former may be more resistant and sometimes less resistant than the latter. Thus in some cases of retro-ocular neuritis the light reflex mây be present though the sight of the eye is absent. At a later stage the sight may have returned and the light reflex be deficient. In cases of neuritis due to intracranial pressure, on the other hand, the light reaction is often diminished at an early stage, while the sight remains good.

At the chiasma the pupillary fibres undergo a semi-decussation along with the visual ones, and most authorities agree that they can be traced as far as the corpora quadrigemina, though some, among whom is Bach, say they can be traced no further and form fresh connections here. Bernheimer maintains that the fibres run an uninterrupted course to the third nerve nucleus, and that the part of it known as the "Edinger Westphal," or small-celled median nucleus, is the part from which the fibres to the sphincter proceed. According to Bach, however, this collection of cells has probably nothing to do with the third nerve.

A curious point is whether or not the pupillary fibres undergo a second semi-decussation in the mid brain. The arguments in favour of the view that they do so are indirect, the strongest of them being one derived from comparative anatomy. In animals with total decussation at the chiasma there is direct but no consensual reaction of the pupil to light. There must therefore be a second total decussation of the pupillary fibres somewhere between the optic tract and the third nerve; otherwise it would be the pupil of the other side that would react. There is, therefore, an *a priori* probability that in animals with semi-decussation at the chiasma there is a second semi-decussation higher up. In the case of man Bach maintains that the direct reaction to light is greater than the consensual, and if this is so it is a further argument in favour of the view that just as the greater number of the fibres cross at the chiasma so they recross higher up and the stimulus to the pupil on the same side is greater than that to the pupil on the opposite side. That this greater reaction of the pupil to direct stimulation is a clinical fact is however not generally admitted. Fuchs and Bumke allow that in some normal cases the direct and consensual reaction are unequal but only to a very slight extent. Bach says that in 80 per cent. of the cases examined by him the more strongly illuminated pupil was smaller by $\frac{1}{4}$ to $\frac{1}{2}$ mm. than its fellow.

Besides the reflex action to light, the pupil may contract in response to a central voluntary impulse such as in involved when the eyes are focussed in a near object. This contraction is neither dependent on convergence nor on accommodation, though ordinarily the same impulse excites at one and the same time the three sets of muscles—the interni, the sphincters and the ciliary muscles. In case, however, one internus is paralyzed, there can be no convergence, yet the other two pairs of muscles respond to the impulse all the same, and the same holds good if the ciliary muscle is inactive, as in myopia. Another phenomenon of the same order is the lid-closing contraction. In pupils normally responsive to light it is difficult to observe, but when the light reflex is absent, if the lids are tightly closed and then opened, the pupils may be observed to enlarge. They must therefore have contracted in response to a common impulse, going to the orbicularis oculi and the sphincter. The reaction may also be elicited reflexly by the stimulation of the fifth nerve by a foreign body on the cornea; but here there may also be the opposite effect produced by the tendency of all sensory stimuli to enlarge the pupil. The lid closing reaction is consensual as well as direct, and hence ordinarily no difference in the two pupils is to be observed, but in a case of partial paralysis of the sphincter on one side the reaction was plainly visible on the paralysed side alone. The phenomenon is rendered more easy to observe by the use of a weak solution of cocain.

As to the nervous mechanism of dilatation, the chief rôle is ordinarily assigned to the sympathetic, but Bach, following

Bumke, distinguishes between active dilatation due to the dilator muscle which the sympathetic supplies and passive dilatation due to inhibition of the sphincter. The two types have been analyzed by special apparatus and photography, and it has been found that dilatation due to stimulation of the sympathetic is characterised by a short latent period, rapid effect and rapid return to the normal, whereas inhibition of the third nerve is followed by a slightly longer latent period, a slight primary dilatation with a rebound, and a more extensive and prolonged secondary dilatation. It is, Bach maintains, by the second, or inhibitory, method that sensory and psychical stimuli produce their effect, and spinal miosis is due not so much to paralysis of the sympathetic as to the loss of the stimuli that normally inhibit the sphincters.

The classification and nomenclature of pupillary disturbances is a subject with which all systematic works deal. Interference with the normal action of the sphincter, apart from intra-ocular conditions, such as iritis, is either of centripetal, centrifugal or of reflex origin. The first occurs with affections of the retina or optic nerve and has been called by previous German writers "Reflextaubheit," reflex deafness; Bach suggests instead the term "amauritische starr," since the inactivity of the pupil is dependent on the loss of sight in the eye. Since, however, the degree of inactivity is by no means dependent necessarily on the degree of amaurosis it would seem better to call these cases simply centripetal or afferent. On the other hand cases of inactivity due to paralysis of the third nerve or to affection of the motor nuclei are called by Bach "absolute," since they involve the convergence as well as the light reaction. Inasmuch as the paralysis due to this cause may be only partial, however, it would serve better to call these cases centrifugal or efferent.

Thirdly, the term reflex inactivity should be restricted to cases showing the Argyll Robertson pupil; in these cases the central mechanism is defective, but both afferent and efferent paths are intact. Interferences with the dilating mechanism might be similarly classified. First there may be an absence of afferent impulses from all over the body and the pupil becomes contracted as in physiological sleep. Secondly, the sympathetic may be paralyzed and the pupil of the affected side becomes relatively small owing to paralysis of its dilator muscle.

Thirdly, there are the cases, quite analogous to those of Argyll Robertson pupil, where, though the senses are awake, the inhibitory apparatus that normally prevents the third nerve from fully contracting the pupil in waking hours is ineffective, or, according to the other view, the reflex mechanism by which the fibres of the sympathetic nerve to the dilator muscle are stimulated, is thrown out of gear. Spinal miosis is an example, and it is an interesting fact (as to which Bumke and Bach agree) that in tabes the loss of the light reflex is commonly associated with the loss of reaction to sensory and psychical stimuli.

The subject of tabes necessarily occupies an important place in any work on the pupil. Is reflex inactivity confined to this disease alone or does it occur in others? Authorities generally put it down to one of three causes, viz: tabes, general paralysis, or syphilis. Inasmuch as the first two diseases are themselves, as a rule, post-syphilitic, and as the pupillary symptom may remain an isolated symptom of tabes for many years, it is not improbable that all cases of true reflex inactivity depend on the same lesion. The diagnosis may be difficult or even impossible in cases of retrogressing partial centrifugal inactivity, for just as the reaction to convergence is slower to disappear under the action of homatropin than the reaction to light, so in a case of partial paralysis of the third nerve the reaction to light may be wholly lost while there is still some reaction to convergence. In tabes, however, the fact that the loss of reflex is so generally binocular, the miosis which is commonly present, and the loss of reaction to sensory stimuli, are all points available for diagnosis, so that practically there is not often much difficulty. Bach tells us that for several years the Argyll Robertson pupil may be one-sided, and for several years it may exist as an isolated symptom, but on neither of these interesting points do we get any statistics. As to the anatomical basis of the symptom we do not as yet seem really to know anything, in spite of copious speculation. The results of postmortem examinations are most ambiguous. The third nerve nucleus, the corpora quadrigemina, and the roots of the third nerve have each been said to be involved, but each of these structures may be perfectly normal. There is considerable evidence to show that degeneration of the posterior columns of the cervical cord is constant, but there is also considerable evidence that it is not. This, however, is the region to which Bach himself looks for an explanation—not, as some have done, *viâ* the sympathetic but by means of the conjectural "centres" at the lower end of the medulla oblongata which he calls "inhibition" centres, and which he was led to believe in by experiments on cats. It is difficult to follow Bach's reasoning here, and possibly not very necessary. As Parsons says*: "One is inclined to wish that this term (centre) might be abolished from neurology, so great is the ambiguity and confusion to which it has given rise." Bach first supposes that the normal action of sensory stimuli is by way of inhibiting the action of the third nerve, and then suggests the existence of two new "centres," the function of one of which it is to inhibit this inhibitory action!

In a final section on the clinical examination of the pupil, Bach recommends that as a matter of routine, quantitative observations should be made of the diameter of each pupil: (1) in dim light, (2) in bright light with both eyes open, (3) in bright light with the fellow eye shut, and (4) in convergence, the comparison being made at each observation with a standard scale.

	Right		Left
Dull light...	5·5	...	5·5 mm.
Bright light. Both eyes open ...	2·75	...	2·75 ,,
Bright light. Fellow eye shaded...	3·0	...	3·0 ,,
Convergence	2·5	...	2·5 ,,

The above case is normal.

	Right		Left
Dull light...	6·0	...	5·5 mm.
Bright light. Both eyes open ...	3·25	...	3·0 ,,
Bright light. Fellow eye shaded...	6·0	...	3·0 ,,
Convergence	2·75–2·5	...	2·5 ,,

The loss of direct reaction on the right side is here the striking feature pointing to "amaurotic" inactivity. Slight inequality of the two pupils from this cause is, according to Bach, common.

	Right		Left
Dull light...	2·0	...	4·75 mm.
Bright light. Both eyes open . .	2·0	...	2·75 ,,
Bright light. Fellow eye shaded...	2·0	...	3·0 ,,
Convergence	1·5–1·0	...	2·5 ,,

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* *Royal London Ophthalmic Hospital Reports,* vol xvi, p. 41.

Here we have complete loss of the light reflex combined with a small pupil on the right side only—reflex inactivity both to light and sensory impressions.

		Right		Left
Dull light...	... ...	5·5	...	5·5 mm.
Bright light.	Both eyes open ...	4·5–4·25	...	2·75 ,,
Bright light.	Fellow eye shaded...	4·5	...	3·0 ,,
Convergence	... ...	4·25–4·0	...	2·75 ,,

This is a case of incomplete paralysis of the centrifugal path on the right side.

To these routine tests those for sensory and psychical reflexes must be added in some cases, but for clinical examination no elaborate mechanism is needed unless it be for the hemiopic reaction, and for this an apparatus devised by Hess is described.

A. H. T.

Hesse (Graz). **Studies in the Hemiopic Pupil Reaction, and the Extent of the Pupillomotor Area of the Retina.** *Klinische Monatsblätter für Augenheilkunde*, Jan., 1909.

In this paper Hesse makes an important contribution to the subject of the hemiopic pupil phenomenon. A good deal of controversy has centred round this symptom, and it is noteworthy that Heddäus, who before Wernicke indicated the possibility of its occurrence, was one of the first also to deny the value of the test. Those who believe it to be unreliable base their objection on two statements:—(1) That only stimulation of the central part of the retina (macula region) can excite pupillary contraction, and that the test is therefore theoretically impossible, and (2) That it is practically impossible to stimulate an isolated portion of the retina without at the same time stimulating other parts, by diffused or diascleral light.

It is obvious that the reflection of light from the ophthalmoscopic mirror, alternately from one side and the other, is open to the second of these objections, and the author points out that other more carefully devised methods of making the test fail to overcome this difficulty.

The most recent and most careful experiments on the subject are those of Hess, and he concludes that the pupillary reflex can only be excited by illumination of an area 4 m.m. in diameter at the centre of the retina.

Hesse's first object was to repeat the experiments of Hess, and this he did without being able in any way to upset his results. Several further series of experiments, on somewhat different lines, also confirmed Hess's view that the pupillary reflex could not be excited by illumination of the periphery of the retina. He finally succeeded, however, in demonstrating that the pupil reflex could be so elicited by the use of a specially devised method. This consisted in an ingenious adaptation of the photographic apparatus of Prof. Dimmer, in whose laboratory his experiments were carried out.

All previous results were fallacious in that they failed to prevent the excitation of the sensitive macula by a certain amount of diffuse light. The author's description of the way in which this difficulty was overcome does not lend itself to abstract and should be read in detail in the original. He succeeded in eliciting a pupillary contraction by light stimuli applied to the retina as far as 45° or 50° from the macula, but the powerful illumination required, and no doubt the technical difficulty also, render the test of no practical value.

He concludes, therefore, that while he has succeeded in demonstrating the reflex excitability of the retinal periphery, and while the hemiopic pupil phenomenon is theoretically possible, the latter cannot be put to any practical use, and on account of the fallacies which attach to earlier methods of carrying out the test, the results hitherto reported are of no value.

The paper also embraces notes on the estimates of the minimum effective light stimulus, and on the question of the "Receiving organ" for the pupil reflex, which, with Hess, the author believes to be the outer segments of the cones.

A. J. Ballantyne.

C. von Pirquet. **Experiences with the Cutaneous Tuberculin Reaction, and the Findings in Two Hundred Postmortem Examinations in Children.** *The Cleveland Medical Journal*, November, 1908.

Von Pirquet's cutaneous test originated in the following manner. He had found that in vaccination against small pox only those persons who have been previously vaccinated show local symptoms within 24 hours. He concluded that if an early local reaction were obtained, the individual had been previously vaccinated. He therefore argued that an early reaction at the point of vaccination with Koch's tuberculin was proof of a previous infection with tuberculosis, and that their cutaneous reaction corresponds to Koch's fever reaction after injection with tuberculin.

A test to differentiate absolutely between active and inactive tuberculosis is greatly to be desired, but in all the different methods of application of tuberculin a satisfactory one in this respect has not been discovered. In general, a newly acquired tuberculosis shows a more severe reaction than one of long standing, but this does not necessarily imply that the process is an active and progressive one.

For consecutive or daily trials in hospital, the cutaneous test is the only one applicable. Each test requires but a small spot of skin, and this method allows a quantitative measurement of the reaction. In the majority of von Pirquet's cases the reaction was tried several times.

Out of about 2,000 children who had undergone the cutaneous test, 200 died, and were subjected to careful postmortem examination. Of these 200 cases, tuberculosis was found in 89; no evidence of tuberculosis was present in 109. The remaining 2 cases showed an uncertain result; in these two the cutaneous test had given a positive reaction. In one adhesions of the left lung and enlargement of numerous glands were found; in the other pericarditis was found, but no indubitable evidence of tubercle.

The 109 cases in which no tuberculosis was demonstrated postmortem, had all given a negative result to the skin test.

Of the 89 cases, which showed tuberculosis at the autopsy, 60 were positive at the first cutaneous test, and 29 were negative. In several instances in the negative group the test failed, according to the writer, because it was made during an attack of measles. Nearly all the remainder of the 29 negative reactions were instances of miliary tuberculosis. In this form of tuberculosis in young children von Pirquet has found that although a positive reaction to his test is often obtained, a negative reaction cannot be held to exclude tubercle.

In very young children a positive reaction may be obtainable almost to the time of death, whereas in older children, and especially in adults, the "re-activity" ceases as the vital powers become exhausted. In infancy a positive reaction to the test means great danger to life. Infection with tuberculosis acquired during the first 6 months of life is nearly always fatal; the older the child at the date of infection, the less dangerous tuberculosis seems to be. von Pirquet holds that the cutaneous test is of especial value during the period from birth to three or five years of age: during these years nearly all infected children react to the first application.

The earlier cases reported by him were nearly all tuberculinized by inoculating two abraded spots with 25 per cent. tuberculin, while a third spot was abraded but uninoculated and acted as a control. His later cases, now reported, were nearly all vaccinated with undiluted old tuberculin.

J. B. L.

Davids (Göttingen). **On the Use of New Tuberculin (Bacillus-Emulsion) in Tuberculosis of the Eye.** *v. Graefe's Archiv.*, 69, 2.

v. Hippel was the first to introduce and systematise the use of Koch's tuberculin in the treatment of tubercular disease in the eye, and in 1904 published the remarkable results which he had obtained with tuberculin T. R. This method has been tried and warmly advocated by others; some, however, have not been so successful, but Davids is of opinion that their failure was most likely due to the fact that the injections had not been continued for a sufficiently long period. v. Hippel himself, however, at times observed a recurrence of the disease in his patients after a full course of tuberculin T.R., and communicated this fact to Koch, who prepared a new form of tuberculin, a "bacillus-emulsion." It was with this preparation (the use of which has so far not been recorded in ophthalmic literature), that Davids treated the series of ten cases of which he gives here a detailed account. This emulsion was obtained by the suspension of pulverised tubercle bacilli in equal parts of water and glycerine, diluted with 0·8 per cent. salt solution. Of these ten patients eight suffered from an inflammation of the cornea or iris (or both combined) which varied in its severity and duration, while in two tubercular conjunctivitis was present. Where choroiditis was detected it was found to be of long standing and not acute, so that it was impossible to make any deductions on the efficacy of the new tuberculin in this variety of tuberculosis.

In all ten cases the results obtained with this preparation were remarkably good: it effected great improvement even in the cases of tubercular conjunctivitis, for which the new tuberculin T.R. has been declared by several writers unsuitable. In the various forms of keratitis the cornea cleared up in a remarkable way, and in all the cases of tubercular iritis the nodules promptly disappeared even when at first they showed a tendency to increase in size or numbers. A similar good result ensued where there were opacities in the vitreous, episcleral nodules, or an exudation over the pupillary area. As an example we may quote the following case (No. 4), that of a married woman, æt. 24, in whom the eye affection had been of very long standing and not amenable to treatment. When she was admitted examination revealed the presence of a nodule in the cornea and severe iritis with posterior synechiæ and exudation over the pupil. A positive reaction after the injection of old ·001 tuberculin confirmed the suspicion of tubercular disease. After 54 injections of bacillus-emulsion, which were raised from $^1/_{500}$mg. to 1mg., and were given over a period of nearly four months, the nodule in the cornea disappeared leaving behind only a very fine nebula, the iritis passed off, and the exudation in the pupil cleared up, so that the vision, from counting fingers at 2 metres, rose to V = ·7—·8. The injections were well tolerated.

The good effect of this form of treatment is most gratifying, especially when one considers how frequently eyes affected with this disease were lost in the pre-tuberculin days, and even when compared with the new tuberculin T.R. the bacillus-emulsion has this advantage that in Davids' patients there was, so far as reports were obtainable, only one recurrence of the complaint within a period of 1–2 years after supervision of these cases had ceased (and in this exception tuberculin T.R. had also been used).

The number of the cases so successfully treated by Davids with this emulsion is admittedly small, but the results have encouraged him to publish them and to express the hope that this, the latest, preparation, which has an additional advantage of being much less expensive than tuberculin T.R., may be more extensively employed. THOS. SNOWBALL.

Wicherkiewicz. **Tenotomy of all four Recti Muscles: its Cosmetic, Prophylactic and Functional Results.** *La Clinique Ophtalmologique*, September 10, 1908.

Starting with the fact, that in a phthisical globe, the recti muscles cause deep grooves and consequent pressure on the ciliary nerves, thus provoking a danger for the other eye, threatening it with sympathetic phenomena, Professor Wicherkiewicz proposes in certain cases to tenotomise the four recti.

Excluding those cases in which enucleation of the injured eye is imperatively called for (*e.g.*, foreign bodies, neoplasms, parasites, irregular cicatrices in the region of the ciliary body) and including cases of phthisis bulbi due to metastatic or traumatic iridocyclitis or uveitis, Professor Wicherkiewicz has satisfied himself that the operation is decidedly useful in three directions.

From the cosmetic point of view, after the operation the small globe becomes more prominent; if the atrophy have not gone too far it becomes quite as prominent as its fellow; if there is a strabismus it disappears; the mobility of the globe is unimpaired. These cosmetic advantages have already been noted in an article by de Wecker, *La Clinique Ophtalmologique*, January 10, 1895. Secondly, the muscular pressure upon and the sensitiveness of the injured eye cease while the danger of sympathy in the other eye is diminished. Even if sympathetic ophthalmitis has already appeared it diminishes in intensity after the operation. Thirdly, an atrophying eye not only regains its form and more or less its position but its perception of light becomes prompter and more exact.

The method of operating is very simple; after cocainizing of the eye a subconjunctival injection of novocaine and adrenalin is made in the direction of the four recti. Then the conjunctiva is divided carefully round the cornea and dissected up a little. The four recti are hooked up and divided at their scleral insertion and finally a circular suture draws the conjunctiva up to the cornea. The suture is removed in 3 to 5 days.

Frank C. Crawley.

Rollet (Lyon). **The Clinical Varieties of Gummatous Iritis.** *Archives d'Ophtalmologie*, May, 1908.

The author has met with twelve cases of syphilitic iritis and classifies them in the following manner:—(1) Circumscribed nodule. (2) Gummatous pseudo-hypopyon. (3) Diffuse syphilitic infiltration.

(1) Of the circumscribed nodule he has seen 8 instances; the nodule was usually solitary and about the size of a pin's head. The ages of the patients varied from 14½ to 50 years and the interval since the appearance of the primary lesion from 5 to 14 months.

(2) Gummatous pseudo-hypopyon closely resembles true hypopyon. The author records 3 cases; the first occured in a woman aged 47, who was suffering at the same time from syphilitic mucous patches and skin eruption. A yellowish mass filled the lower half of the anterior chamber; the iris was dull and much discoloured. Under anti-syphilitic treatment the eye recovered with $^{6}/_{24}$ vision.

The second case also was in a woman aged 47 who had had a primary sore of the cheek 5 months previously; this had changed into a large secondary papule accompanied by swollen submaxillary glands. There were also mucous patches present. The left eye showed well-marked yellowish hypopyon. Under antisyphilitic treatment the eye recovered leaving the pupil more or less blocked with exudation, for which an iridectomy was subsequently performed. More recently a man aged 42 was seen with this condition. The specific history dated back 26 years.

Diffuse syphilitic infiltration was seen once only. The patient was a strong man aged 35 who had acquired syphilis 10 months previously. The left eye at first showed a discoloured iris with minute hæmorrhages and keratitis punctata; the right eye was only slightly affected. After an appearance as of hypopyon the left cornea bulged and four weeks later the eye had to be excised on account of pain. In spite of vigorous anti-syphilitic treatment the lungs and kidneys became affected and the patient died of hæmoptysis 5 months after the commencement of the ocular trouble and 15 months after the primary lesion. Microscopical examination of the excised eye showed diffuse infiltration of the sclerotic, choroid, ciliary body, iris and cornea. No spirochætes could be demonstrated. At the autopsy were found gummata of the liver, diaphragm and kidneys, and diffuse infiltration of the lung resembling caseating pneumonia.

The author considers that the case was undoubtedly one of malignant syphilis but to the reviewer it seems much more likely to have been tuberculosis in a syphilitic subject.

E. W. Brewerton.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Meeting, Thursday, January 28th, 1909.

The President, Mr. Marcus Gunn, in the Chair.

Card Specimens.

? Tubercular Mass in the Choroid.—Mr. A. W. Ormond.

L. H., female, aged 39, had had defective sight in the left eye for 3 months. R.v. = $^6/_6$; L.v. = $^6/_{24}$. In the left fundus situated below and to the outer side of the optic disc was a solid soft-looking mass pushing the retina forwards, the top of which was seen with a + 7; the margins were ill defined, fringed with hæmorrhages, and there was no pigmentation. On the assumption that the growth was of a tubercular nature ·005 c.c. of T.O.A. was injected, and in 28 hours a reaction had occurred, the temperature rising to 99·4°; 4 days later a dose twice the strength of the first was administered and the temperature rose in 12 hours to 103·8°. Koch's Tuberculin (T.R.), ·0001 mg., was given at intervals of 14 days; after 3 months treatment the swelling had not diminished in height though its boundaries had contracted.

Peculiar Opacity of the Cornea.—Mr. R. W. Doyne.

A. J. B., aged 64, male, was first seen in June, 1905. Opacities were seen both in the corneæ and the lenses; the patient had suffered from diabetes for the last 2 years. There was some myopic astigmatism which had been corrected with glasses; and whereas in 1905 the vision in each eye with correction was $^6/_{12}$ pt., it had deteriorated to $^6/_{18}$ in the Right and $^6/_{36}$ in the Left by the end of January, 1909. In 1896 it was known definitely that the corneal opacities did not exist.

The condition shews a haziness of the cornea occupying the whole of the central area extending almost up to the limbus and sharply defined at the periphery.

In the discussion on this case, it was generally thought to be of the nature of a degeneration, similar to transverse band opacity of the cornea only of wider extent.

Papers.

Four Generations of Lamellar Cataracts.—Mr. N. Bishop Harman.

Mr. Bishop Harman shewed a pedigree of a family of five generations, four of which presented a marked inheritance of congenital cataracts. Seventeen childships were traced comprising 63 persons; 8 died in infancy, and of the remaining 55 it was known that 19 had congenital cataract. In no case had there been any in-breeding, or marriage with a person from a family similarly affected. The type of cataract was for the most part central opacities, of varying size, some were minute Y-, X-, or star-shaped, while others shewed definite lamellar formation. In some cases the cataracts were of long standing and no evidence could be found that they progressed beyond the stage at which they were first seen. Probably the number of cases of cataract found does not represent the true total, for in one childship of seven members, amongst whom only one case of cataract was admitted, examination of the seven shewed that four had lenticular opacities.

The inheritance was strictly from those who had cataract, in no case was cataract found in a child where the parents were free from the defect. When the defect had disappeared from a branch of the family it did not tend to reappear.

The teeth usually were good. and no other developmental errors were found.

An unusually rapid development of complete Cataract in a Boy.—Mr. N. Bishop Harman.

The case described was that of a boy aged $9\frac{3}{4}$ years, whose mother stated that nine months ago the sight was good in both eyes, after which it got suddenly worse, so that when he came under observation he was practically blind. Both lenses were found to be completely cataractous, and no cause whatever, either in the boy's own history or in the family history, could be found to account for the condition. After curette evacuation the vision obtained was $^6/_6$ in each eye.

Note on the Colours of Benham's Top.—Mr. A. S. Percival.

Mr. Percival considered that the phenomena observed with this top support the theory of Young-Helmholtz in regard to colour vision. He quoted from a paper by Mr. G. N. Stewart in the Proceedings of the Royal Society of Edinburgh for 1888, in which experiments were described in relation to Talbot's law. and he finds that there is no appreciable departure from this law even where the stimulus lasts only $\frac{1}{8000000}$ of a second; and he also shews that where the stimulus acts a long time there is an excitation of all colours, giving the sensation of white; if on the other hand the stimulus acts for a shorter time then violet preponderates, and again if for a very short time the red colour is more prominent. In connection with the colours seen in Benham's Top Mr. Percival shewed that the phenomenon depends on the irradiation of the surrounding white area over the edges of the black line, and the actual colour produced is dependent on the rate and direction of rotation.

Note on Some Rhythmic Oscillations of the Pupil.—Mr. A. S. Percival.

Rhythmic contraction and dilatation of the pupils is well known as a phenomenon in many diseases; and Mr. Percival compared this with the oscillatory discharge from a Leyden jar. It is found that if the discharge is made through a conductor of high resistance such as a recently dried linen thread, it simply dies away, the current at first increasing in strength and then gradually fading. If, however, the discharge is made through a coil of wire of lower resistance, the effect is wholly different, for then the discharge consists of a number of excessively rapid oscillations. If we may assume that nerve cells and axis cylinders represent the Leyden jar and conducting wire then we may surmise that the nerve fibres exhibit the same phenomenon of induction as the wire. In retrobulbar neuritis, for example, owing to nerve atrophy, the resistance decreases because the fibres are more closely in contact and the oscillatory movements take place. The same explanation can be applied to the condition of the pupils found in disseminated sclerosis.

A Case of Retinal Exudation with Extreme Distension of vessels, and perhaps Arterio-venous Anastomosis.—Mr. D. J. Wood.

This paper was accompanied by a coloured drawing illustrating the condition of the fundus; and in the course of his remarks the author alluded to similar cases described in the Transactions of the Ophthalmological Society, Vol. xii, p. 143, 1902, and Vol. xxv, p. 96, 1905.

The patient, a female, was first seen in 1902, when two large blood vessels were seen running up to a white patch in the upper and outer part of the right fundus. In November, 1907, when the patient was 50 years of age, the right eye failed suddenly, only large objects being visible. At first, owing to diffuse opacity in the vitreous, no details of the fundus could be made out, but later on a white area was seen upwards and outwards from the disc with two enormously dilated vessels running up to it; their colour was intermediate between arteries and veins, but from the left trunk a vessel sprang which was arterial in colour, while another vessel, evidently venous, was given off from the opposite trunk. The question arose as to whether the condition was sarcomatous, but judging by its similarity to the other cases described, it was decided not to excise the eye but to watch for a time its subsequent course.

Mr. Coats referred to similar cases which had come under his notice, and were embodied in a paper appearing in the last number of the Royal London Hospital reports.

Thursday, February 11th, 1909.

Mr. NETTLESHIP, in the Chair.

1. *Finished Models of the Diaphragm Test.*—Mr. N. Bishop Harman.

The models for the employment of this test, which were described at the meeting of the Society in December, 1908, were now shewn in their completed state.

2. *Tobacco Amblyopia; a substitute for Smoking.*—Mr. N. Bishop Harman.

The difficulty which many smokers have in giving up tobacco Mr. Harman found was alleviated by chewing quassia chips; and he had consequently instructed Fuller's to prepare it in the form of a chewing gum containing 1 in 20 of quassia extract.

3. *A Case of probable lack of separation of M. Levator Palpebrae Superioris and M. Rectus Superioris; unilateral.*—Mr. N. Bishop Harman.

D. S., a healthy girl, aged 10, said that her eyes had always "appeared strange." There was a history of not being able to open the right eye for the three days after birth. No instruments were used at the child's birth. The child could fix with either eye but preferred the left: and the appearances differed according to which eye was for the moment the fixing one. If the right eye fixed, the left upper lid dropped 3 mm. and the eye turned slightly down and in. If on the other hand the left eye fixed, the right turned up and in. During concomitant movements, those of the left were perfect and full, while the right failed to follow the left in extreme elevation.

Mr. Harman considered that the only reasonable explanation was that there had been a failure in the separation of the original muscular mass which produces the levator palpebrae superioris and superior rectus; such incomplete separation is common in lower vertebrates.

Obstruction of Cilio-Retinal Artery.—Mr. A. Levy.

A coloured drawing accompanied this case. The patient, a girl aged 22, complained that 6 days previously the vision in the right eye suddenly failed. During a previous visit to Moorfields on account of squint her vision had been recorded as $^6/_6$; it was at the present time $^6/_{60}$. Stretching for 3 or 4 disc-diameters outwards was a broad patch of exudation, coinciding with the distribution of a vessel beginning at the outer margin of the disc. There was some evidence of arteriosclerosis in the other retinal vessels.

A Case of Aniridia.—Mr. J. F. Cunningham.

The case was that of a little girl aged 10, and the family history had been traced back to the 4th generation. The main points in this genealogical tree were that the patient's father and grandmother were affected with the same condition, also her great-grandfather. Her grandfather and his wife were first cousins.

Ophthalmoscopic Drawings.—Mr. E. Nettleship.

1. A coloured drawing of hæmorrhages, probably choroidal in origin, at the macular region in a highly myopic eye, apparently caused by a blow on the corresponding eyebrow. There was also hæmorrhage into the vitreous, and externally some red patches could be seen round the openings for the anterior ciliary arteries.

2. Drawing of a fundus shewing scattered spots of posterior choroiditis which are peculiar in being, with one or two exceptions, placed exactly beneath retinal vessels, and these vessels were invariably veins.

3. Drawing of the fundus of a woman aged 45, who had been the subject of syphilis 1½ years previously. The drawing shewed active disseminated choroiditis, the special feature being that the choroidal foci were arranged in chains following exactly the course of the retinal veins.

In this connection Mr. Nettleship observed that he had noticed in retinitis pigmentosa, that where the pigmentation surrounded a vessel, this vessel was always found to be a vein and not an artery.

Pituitary Neoplasm with Ocular symptoms in a child aged 10.—Mr. W. Ilbert Hancock.

Emily S., aged 10, first came under observation in May, 1908, with the history of defective sight in the left eye of 14 days' duration. For about a month the child had complained of headache, and the mother had noticed her face swelled at times, more especially on the left side. The general condition was satisfactory except for some carious teeth. R.v. $^6/_{24}$ and J 12, the pupil reacted sluggishly to light and the fundus was normal; the L.v. was no P.L., and the pupil was inactive to direct stimulation though acting consensually; the temporal half of the disc was pale. By the end of May, under treatment in the Hospital, the vision in the right eye improved to $^6/_{12}$, and that of the left to finger counting in the temporal field.

In January, 1909, the child again came under observation, when left vision was $^6/_9$ and J1, with a pale disc and normal vessels; the field shewed temporal hemianopsia. The left eye gave no P.L., with the disc atrophic, though vessels good.

On examining the body generally there was found to be some abnormal adiposity which was definitely greater on the left side than the right. The thyroid and thymus glands were not enlarged; and the nervous system were found normal. The child gives the impression of a stunted, heavily-built, and somewhat overgrown girl.

The discovery of temporal hemianopia suggested pressure on the chiasma, and an X-ray photograph taken by Mr. Mackenzie Davidson revealed a small roundish body situated in the brain a little in front of the sella turcica about half an inch above the base of the skull and a little to the left of the middle line.

Mr. Davidson subsequently stated that he considered the rounded shadow to be caused by a patch of calcareous deposit in a tumour.

Cyst of the Iris.—Mr. E. W. Brewerton.

M. S., female, aged 28, whose right eye had been excised in 1898 for what was thought to be tubercle, suffered in 1903 from a recurrent attack of plastic iridocyclitis, the pupillary area became blocked with lymph and the lower half of the anterior chamber was filled with organized exudate. The vision had sunk to counting fingers at 10 inches. An optical iridectomy was performed above in 1906 and the vision improved to $^5/_{60}$. In February, 1907, a small black spot appeared in the lower half of the anterior chamber, the tension was raised, and from this time the eyeball gradually enlarged; the black spot increased in size so that at the present time it measures 10 mm. horizontally and 5 mm. vertically. By transillumination this dark area is found to transmit light readily, thus excluding new growth; and it was thought that by contraction and retraction of the organized exudate the two pigmentary layers of the iris had become separated and formed a cyst.

Two Cases of Hereditary Optic Atrophy in a family, with recovery in one case.—Dr. Rayner Batten.

The patients were two brothers, aged 24 and 10 respectively, whose sight had diminished to $^6/_{60}$ in both eyes in each case. The loss of vision was gradual in the elder, having begun at 16, while that of the younger was rapid. The younger patient's sight improved to $^6/_6$ with both eyes in a few months, and the visual field correspondingly enlarged to almost normal. though the discs remained pale. The grandfather of the family was the subject of optic atrophy.

Quinine Amblyopia from a single dose (ʒi) *of Sulphate of Quinine.*—Mr. Cargill.

E. M., female, aged 28. The sight had failed 9 months previously after taking ʒi of Quinine Sulphate; it was accompanied by severe tinnitus, deafness, and giddiness. The vision gradually improved so that it is now $^6/_9$ in one eye and $^6/_{12}$ in the other. The irides act to central illumination only, the discs are pale, and the vessels small.

Rodent Ulcer of the Right Eyelid and Nose treated by X-Rays and Zinc Ionisation.—Mr. Cargill.

G. E., aged 80 years, male, had noticed an ulcer on the right side of the nose for 15 years, and during the last 5 years it had also involved the eyelid. Treatment began in October, 1908, with ionization of the nasal ulcer with $\mathrm{Zn\,SO_4}$ 2% using the positive electrode, 2 m.a. being applied for 7 minutes; 2 days later another application was given, and the ulcer healed in 19 days. The ulcer on the eyelid was now being treated with X-rays, and up to the present there had been 20 sittings of seven minutes' duration.

Flattening of both Corneæ after Phlyctenular Keratitis.—Mr. Hugh Thompson and Mr. F. Hewkley.

The patient, 19½ years old, had suffered from phlyctenular keratitis 6 years ago, from which nebulae had resulted. In 1904 with a +2·5 sphere in both eyes the vision was $^6/_{36}$; in 1909 it is $^6/_{36}$ in the right and $^6/_{18}$ in the left, with +13 D each.

Annular Arcus Senilis in a man aged 27.—Mr. Lawson.

This defect had been noticed nine years, and the arcus almost completely surrounded the cornea; both corneæ were faintly nebulous as a result of trachomatous pannus, and it was suggested that there might be some connection between the two conditions.

Optic Atrophy Secondary to Hæmorrhage into Optic Nerve Sheath.—Mr. Lang.

E. J. B., 42, was crushed by a heavy weight (1½ tons) falling on him; the pressure seemed to cause protrusion of the eyeballs, and blood exuded from the nose and mouth. He was blind for 14 days afterwards. At the present time the vision of the right eye is $^5/_4$, field contracted, and lower part of the disc pale, while the left has no perception of light, the disc is atrophic, and the field of vision shews defect in the upper half. The vessels are normal on both sides.

? Lympho Sarcoma of the Lids.—Mr. Lang.

This was the case of a man who had been operated on in the Middlesex Hospital for nodular masses of lymphoid tissue growing in both upper lids. The condition had not very much improved, and appeared to be of the nature of a lympho-sarcoma.

Hyaline Bodies in the Vitreous.—Mr. Hosford.

A male, aged 73, who had been the subject of syphilis 45 years previously came complaining of failing sight for 6 years. R.v. $= {}^{6}/_{18}$, L.v. $= {}^{6}/_{12}$. In the right vitreous was a slightly tremulous fibrous diaphragm studded with variously shaped translucent glittering bodies. The left vitreous was also affected.

Retinal changes the result of Concussion Injury.—Mr. R. E. Bickerton.

The patient had received a heavy blow on the right side of the face sufficiently severe to crush the zygomatic arch. The right eye became blind immediately afterwards and had not recovered since. The vision was finger counting eccentrically, the pupil reacted to light, and in the macular region there was the appearance of a hole in the retina with a rounded patch of pigmentary disturbance down and out; the disc was pale.

MALCOLM L. HEPBURN.

We are asked to remind our readers of the approaching International Medical Congress which is to take place this year in Buda Pest, from 29th August to 4th September. Those desiring to join the Ophthalmology Section should communicate with Prof. Emil Grósz, Reviczky-ter. 5, Buda Pest.

THE DIAPHRAGM TEST FOR BINOCULAR VISION.*

By N. Bishop Harman, M.B. (Cantab.), F.R.C.S.

Assistant Ophthalmic Surgeon to the West London Hospital.

This test is the reverse of Javal's well-known "Bar-reading" test. Instead of a bar which the patient's eyes must negotiate, there is a screen with a single hole in it; through this hole the patient can look with both eyes, quite naturally, and without suspecting the manner in which his vision is being dissected.

The test rests on a phenomenon that occurs to everyone many times daily; when a window is looked through the man with binocular vision sees more widely than he who has but one eye. To demonstrate the principle of the test the following experiment may be made: Stand facing a wide view, hold up both hands, palms towards you, six inches from your face and on a level with the eyes, let the hands be separated so that the little fingers are distant from each other three fingers' breadth. It will be found that the hands cover the eyes, yet a perfectly clear perception of the view is obtained. But if one eye be closed half the view is lost, for the right hand obscures the direct vision of the right eye and the left hand that of the left eye; but the eyes see cross-wise through the space between the hands. The paths of the vision are shown in figure 1, and the manner in which right and left monocular and also binocular vision is arranged for.

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* Demonstrated to the Ophthalmological Society of the United Kingdom, December 10th, 1908.

The instrument made to apply this test in practice is very simple, but a series of most varied and surprising tests may be made with it. They are so simple that the operator is not likely to be tied up in examining a patient, yet they are so subtle that when an expert is submitted to the test he can only escape confusion by stating simply what he sees.

THE INSTRUMENT.

A length of wood like a flat ruler 44 c.m. long is fitted with a rack at one end to receive the test cards, and a screen measuring 9×6 c.m. fixed at 11 c.m. from the rack. In this screen, or diaphragm, a hole is cut; it is either square or round and measures 1·7 c.m. square or diameter. A moveable pin is fixed to the diaphragm so that it can be projected into the hole as a point of fixation in certain experiments. A handle is fixed beneath the base board.*

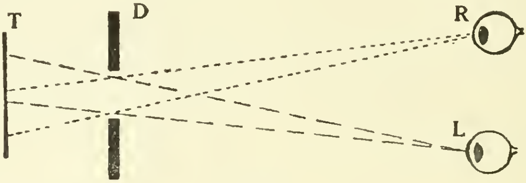

Fig. 1.

T = Test card ; D = Diaphragm with hole.

Method of Handling.

In use the patient takes hold of the handle with *both* hands and places the free end of the rule (this is wash-able) against the upper lip just beneath the nose. The surgeon stands facing his patient and holds the other end of the instrument to keep it steady. When the instrument is in position the patient is asked to look either through the hole, or at the pointer projecting into it, according to the test desired, and to tell what he sees through the hole.

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* The instrument is made in suitable materials in excellent fashion by Messrs. George Culver, Ltd., of White Lion Street, London; it costs only a few shillings.

Test Cards.

There are three sorts: 1. Printed matter, of any size from diamond in set paragraphs to canon in paired capitals. 2. Black or coloured squares variously disposed. 3. Pictures for children. A number of test cards are isued with the instrument, but the surgeon can make and vary them indefinitely.

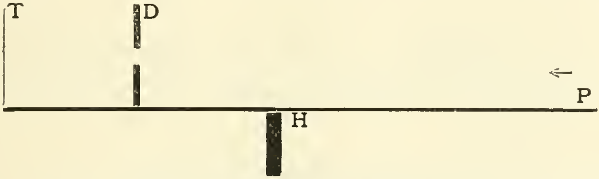


Fig. 2. Side elevation of "Diaphragm Test": T = test card; D = Screen with hole; P = position of patient, who looks in direction of arrow; H = handle. Distance from T to D = 11 c.m.; from D to P = 33 c.m. Diaphragm is 1·7 c.m. square, or diameter.

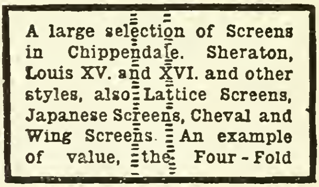
The Diaphragm.

The screen with the square hole is most generally useful; for the reading tests particularly, and when we wish to demonstrate the presence of binocular vision where it is denied. When the patient looks clear through the hole at the test the margins of the hole are seen doubled, the square becomes an oblong; this change escapes remark save by the most observant. On the other hand when it is desired to demonstrate weakness of binocular vision or in fusion experiments the round hole is the better, as reduplication of the circle and overlapping of the two images is very noticeable.

THE USAGES OF THE DIAPHRAGM TEST.

The test is of value for the following purposes :—

1. To determine the equality of visual acuity in the two eyes.
2. To determine the presence, the absence, or a defect of binocular vision.
3. To exercise the vision in squinting eyes.
4. To detect malingerers feigning monocular blindness.
5. To demonstrate certain physiological phenomena connected with the perception and suppression of images.



**A large selection of Screens
in Chippendale. Sheraton,
Louis XV. and XVI. and other
styles, also Lattice Screens,
Japanese Screens, Cheval and
Wing Screens. An example
of value, the Four-Fold**

Fig. 3.

The dotted lines indicate the overlapping of the crossed images of the square hole.

1. *Equality of visual acuity of the two eyes.*

A paragraph of printed matter is put in the test rack, the patient is desired to read it. The plan of the instrument is such that three kinds of vision are required to pass the test. The right half of the test is read by the left eye, the left half by the right eye, and the middle strip by both eyes (fig. 3). If the patient can detect no difference in the clearness of the letters on the card the eyes have equal vision. The test is very delicate. Further, this cannot be passed unless there be good balance of the oculo-motor muscles.

2. *Binocular vision and its defects.*

The preceding test when small type is used is the most delicate test of this nature, a small degree of latent squint will prevent a man from reading the paragraph accurately. The phenomena produced by the various orders of latent squint can be best shewn by the use of the test card with a single line of letters or figures:—

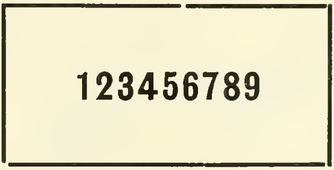


Fig. 4.

The man with good binocular vision reads 1234 with the right eye, 6789 with the left, and 5 with both eyes (fig. 4.).

In latent convergence (esophoria) the middle letters are over-lapped and are suppressed so that the man reads something like this:—

126789

In latent divergence (exophoria) the middle letter is reduplicated, and the man reads:—

12345 56789

In latent vertical displacement (hyperphoria) the parts of the line of letters seen by each eye are on different lines or levels, thus:—

12345
56789

All these phenomena can be seen by the surgeon himself who has perfect binocular vision, when he causes disturbance of his muscles by putting a prism before one eye, or more simply by just displacing one eye slightly by gentle pressure with one finger. It is astonishing how readily this simple device displays latent irregularities in the muscle balance of the eyes.

In the case of children suspected of squint, their capability for binocular vision can be ascertained by the diaphragm test more easily and at an earlier age than by any other means. There are a series of bold and simple drawings of familiar objects supplied with the instrument (fig. 5). The child looks at a pair of pictures through the hole of the diaphragm, if they are named promptly there is good evidence that the vision of one eye is not suppressed. The youngest patient I have yet tried with the test was a girl, aged 2 years and 5 months, she had not seen these particular pictures before, but she named them all correctly looking at them through the hole, and she wanted to see some more!

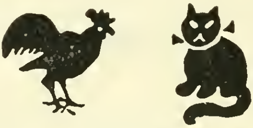


Fig. 5.

3. *Exercises for squinters.*

Monocular alternate fixation, and binocular fusion can be practised through a series of graded tests, from coloured patches, pictures, and large letters to small print.* When one eye by reason of disuse has a lesser visual acuity than the other the superiority of the better eye can be reduced by paralysing the accommodation of that eye with atropine, by shading the half of the tests to be seen with that eye, or by placing such a glass before that eye as will reduce the vision to an equality with the weaker eye.

4. *Detection of Malingerers.*

We cannot have too many tests for the detection of feigned monocular blindness, but a good test must be simple. Here is one that is so simple that the surgeon cannot get tied up in using it, yet it is so subtle that an expert can be trapped.

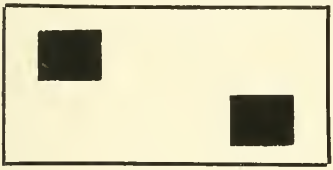


Fig. 6.

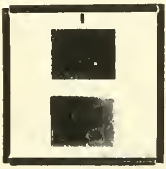


Fig. 7.

There are test cards with squares printed thereon, coloured, red and green, or black for use with the colour blind. The squares are printed right and left, any number may be used, but one each side is enough; and the patches are on different lines so that they cannot be fused by convergence (fig. 6).

The cards are reversible, so that the red and green cards can be exhibited four different ways: red to right, to left, above, or below.

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* A very cheap form of instrument with test cards is made for patients' use.

One of these cards is put in the rack, and the patient asked what he sees. (1) He may be told to look through the hole, then he sees the patches as they are on the card and must name them. Suppose, an extreme improbability, the man knows the patches are seen by crossed vision, and correctly evades naming the patch seen by the pseudo-amaurotic eye; yet he does not escape, for the surgeon watching the man's eyes will see *the coordinate movements of the eyes as he looks from one to other area of crossed vision.* This movement is conclusive of two-eyed vision, a man truly blind of one eye does not make it.

(2) He may be told to look at the pointer and so converge, then he gets homonymous diplopia for the patches and one appears above the other (fig. 7). When seen in this latter fashion it is impossible for the patient to guess whether one or other eye, or both eyes, sees the patches: even the cards may be changed so that the red is seen by the right and left eyes alternately, yet the change will not be detected.

The tests are so good that there is no objection to the patient seeing all the test cards laid out on the table before-hand. During the testing the surgeon has the man's eyes under perfect observation, at the suggestion of a wink on the part of the man the test can be dipped and obscured. Lastly, even when the eyes differ considerably in visual acuity the test with coloured patches can be used successfully, for colour can be perceived when form is obscure.

5. *Physiological alternation of perception and suppression of diverse images.*

There is one test with which very curious results may be obtained. On one half of a test card is drawn a cross of St. George, on the other half is drawn a cross of St. Andrew (fig. 8). The crosses are placed in such relations that when the test is in position and the pointer is set in the round hole of the diaphragm and the two eyes are fixed upon it, the images of the crosses are superimposed and fused. Now for a moment the fused images of the crosses present the appearance of a star of eight points. But it will be found that this appearance is not constant for the whole time of the observation; there succeeds an alternation in the perception of the images seen by the right and left eyes, so that as though by an electric flashing sign the crosses of St. George and St. Andrew pulsate upon the screen. The experiment can be varied by the use of a variety of geometrical figures, parts of circles, etc.

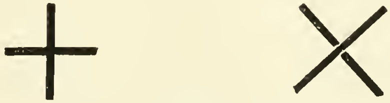

Fig. 8.

The effect is very curious, and the seemingly definite rhythm of the alternation suggests some reason for the phenomenon. There are two possible explanations:— 1. That fixation is not constant, and that unconsciously it falls off, but is renewed when the fading of the images occurs. 2. That since in perfect binocular vision the two maculae and the two halves of the brain have learned to view and perceive but one object of fixation at a time, the brain is now incapable of retaining constantly the perception of two dissimilar objects seen by the two maculae. The brain does it for a moment, at the instant of the first attempt, but then the image of one and then of the other object is perceived and suppressed in turn. We may suppose the visual apparatus reverts to a primitive separated condition!

CONCLUSION.

In conclusion I suggest that the "Diaphragm Test" puts a very useful and handy every-day servant in the hands of the ophthalmic surgeon, one that will tell him many secrets with a minimum of explanation and direction to the patient, and that the test is not unworthy to be considered one of the simplest methods for the experimental demonstration of binocular vision.

MR. PERCIVAL POTT AND THE TREATMENT OF LACHRYMAL OBSTRUCTION.

By A. Freeland Fergus, M.D.

Surgeon to the Glasgow Eye Infirmary.

It was said in long gone ages that there is nothing new under the sun, and we have just come across another illustration of this partial truth in a monograph written by Mr. Percival Pott entitled "Observations of that Disorder of the corner of the Eye commonly called Fistula Lachrymalis," and published in London in the year 1758. In this communication the author quite clearly describes two methods of treatment which are generally supposed to be of much more recent origin, namely, that by probing and that by perforation into the nares. It is not part of our present purpose to follow the author in detail into his views on the anatomy of the parts and the pathology of the condition, suffice it to say that no doubt he was much in advance of the writers of his time. With reference to his article we only wish to mention the portions in which he indicates those two distinct lines of modern treatment perfectly clearly and distinctly. Thus he says:—" In the first and most simple state of this disease, viz., that of mere obstruction without any inflammation, modern practitioners have taken a good deal of pains to restore the parts to their natural state and use without any wound or division."

" The introduction of a probe, the injection of a fluid and the best of machinery to make a constant compression on the outside of the sacculus are the principal means by which this has been attempted.

" Some few years ago M. Anel made a probe of so small a size as to be capable of passing from the eyelid into the nose, being introduced at one of the puncta lachrymalia and passing through the sacculus and duct; with this probe he proposed breaking through any small obstruction that might be in the way of it.

" He also invented a syringe whose pipe is small enough to enter one of the puncta and by that means furnish an opportunity of injecting a liquor into the sacculus and duct, and with these two instruments he pretended to be able to cure this disease whenever it consisted in obstruction merely and that the discharge was not very purulent."

Pott's experience as regards the use of a probe would appear not to have been particularly fortunate. He says that he has used the method of treatment but that it gives rise to considerable pain, and that the inflammation which it often excites is much greater than any benefit derived. Probably were modern ophthalmic surgeons carefully to review their own work they would, like Mr. Pott, confess that the treatment by probing is not satisfactory. He seems to have had better results from the use of the syringe. He says, " The syringe, if used while the disease is recent, the sac very little dilated and the mucous perfectly clear, will sometimes be serviceable. I have by its means injected a fluid through the sacculus into the nose and in two or three cases the patients have got perfectly well."

Before discussing the modern practice of the treatment of lachrymal disease it will I daresay interest the reader to hear what the author had to say as to a perforation being made between the sac and the nares. On page 63 we find, " I have already taken notice that the upper and hinder part of the sacculus lachrymalis is firmly attached to the os-unguis, a small thin bone just within the orbit, but this bone is so situated that if it be by any means broke through or removed the two cavities of the nose and orbit communicate with each other, consequently the os-unguis forms a partition between the hinder part of the sacculus lachrymalis and the upper part of the cavity of the nose, and it is by making a breach in this partition that we attempt the formation of an artificial passage for the lachrymal fluid."

A considerable portion of the essay is devoted to a discussion as to the best means of obtaining this passage of communication so that it may be permanent. In another part of his discourse he mentions removal of the sac, a process which he condemns as he says it is impossible thereafter to renew the passage.

In the same monograph we find it stated that the

French Academy of Surgery published some papers in which it was proposed that the probe should be passed from the nose up into the sac and that fluids might be injected in the same way.

From the foregoing it must be abundantly apparent that so far back as 1758 Mr. Pott had at his command the essentials of the most modern treatment of lachrymal disease. The only thing which modern surgeons do which is not mentioned by Mr. Pott is the slitting of the canaliculus with a Weber or other knife. We have never been able to appreciate the indication of this treatment. In our opinion it ought to be employed only in one class of cases, namely, those in which there is such a degree of ectropion that the punctum is no longer in contact with the conjunctiva of the eyeball. It is conceivable in such circumstances that if a canaliculus, preferably the superior, be properly slit drainage may take place at the inner canthus, but we regard such slitting as little else than malpraxis when there is no ectropion but only an obstruction, real or supposed, between the duct and the sac. It is sometimes said that the canaliculus is slit so as to facilitate the introduction of probes or of the nozzle of a syringe. We have always found that the proper and judicious use of Nettleship's dilator will make the passage wide enough to allow of probes and other instruments being introduced without the destruction of the lachrymal passages.

Percival Pott gave up the use of probes because he found that little or no benefit was to be derived from their employment. To most ophthalmic surgeons the modern use of the probe is largely associated with the name of Bowman, and unquestionably the great authority which his name has necessarily given to them has determined the practice of most surgeons of recent years; yet the results in modern times are perhaps no better than those obtained by Mr. Percival Pott.

Visiting numerous clinics in the course of the year we find large numbers of patients who attend regularly and who have attended for many years to have probes passed on account of suppuration in the sac. If you get a patient in middle life who has a dacryo-cystitis you will all but invariably find that the patient at some prior time of life has undergone treatment by probing.

The huge instruments used by Theobald and others and the numerous modifications that have been made in the shape of probes are all indications that results have not been satisfactory, and that there is still something further desired. We have no wish to take up any prejudiced or erroneous position, all we want is that reliable data shall be gathered together. It would be well if a number of surgeons whose results could be thoroughly relied upon were to note how many cases treated by probing were entirely cured of chronic dacryo-cystitis within say a period of two years from the time at which they began the treatment. We venture to think that the number would be extremely small.

The method of treatment by probing has for a considerable time seemed to us to involve a radical mistake as regards the pathology of the condition. The original entity is not in the large majority of cases obstruction or stricture, it is the presence of a pyogenic membrane.

The inflammation to which this gives rise may no doubt in time cause a stricture, but so long as the treatment is devoted to this stricture, which is purely secondary and not primary, so long will results be disappointing. The whole question then resolves itself into what is the best method of restoring the membrane to a healthy condition. The answer is not altogether easy. To begin with, probing is of use only in so far as it secures drainage, and for this limited purpose there are on the market no better probes than those of Sir William Bowman or the small silver probes of Snellen. These are instruments which can be introduced without much risk for the act of probing is not altogether free from danger. On more than one occasion we have seen laceration of the tissues caused by the careless passing of a probe give rise to septic infection of the cellular tissue in the neighbourhood of the sac. For this reason we consider large probes to be positively dangerous. As already indicated small, thin probes are the best and they should be very gently used. The instrument should be held as near its point as is convenient and carefully shoved along the various passages.

But the mere passing of a probe will not to any extent influence the septic condition of the mucous membrane; that, however, may be modified by thorough irrigation with a syringe; for this purpose normal saline will be found as satisfactory as anything else.

We are not acquainted with any drug which will render the tissues of the sac aseptic by destroying the micro-organisms. Notwithstanding all that has been written about them, Protargol, Argyrol, *et hoc genus omne* have been shown to be all but inert and of practically no value as germicides. Of the lot probably Protargol is the one whose germicidal properties are the least feeble, but we think that even when it is selected for introduction into the sac any benefit depends upon the irrigation and not upon the salt.

In like manner in our own experience the best results yet obtained in the treatment of ophthalmia neonatorum are got by the thorough irrigation of the conjunctival sac with normal saline. Unquestionably solutions of Argyrol and Protargol give better results than nitrate of silver for the simple and obvious reason that nitrate of silver does harm by destroying the epithelium of the tisues and allowing the septic material freer access. Argyrol and Protargol are practically inert and therefore can be used without any detriment.

For these reasons our invariable practice in chronic dacryo-cystitis is to begin the treatment by the passing of Bowman's probes and the thorough irrigation of the sac with normal saline. Occasionally that succeeds in putting the matter right; if it does not, then the only other rational treatment is to remove the lachrymal sac altogether, an operation which in the main is tolerably easily executed. As a rule the removal of the sac gives the patient perfect comfort. There is not as might be supposed an undue amount of lachrymation; the patient only very rarely suffers from watering of the eye. A considerable number of sacs have now been removed either by the author of this paper or at his instigation by his colleague, Dr. McMillan, and only on one occasion has there been a troublesome amount of watering, which was easily put right by the removal of the lachrymal gland on the same side. Since this secondary operation was done the patient has been extremely comfortable and the eye feels perfectly well. This of course tends to confirm the opinion held by many that the tears are only as it were secreted when there is urgency, and that the ordinary lubrication of the eyeball is carried on by the mucous fluid of the conjunctiva. Ocasionally and most disappointingly the removal of the sac does not cause purulent discharge to cease; this is particularly true when a portion of the sac has inadvertently been left *in situ*. Nor is a recurrence of the suppuration uncommon when the disease is of tuberculous origin. The tubercular invasion is apt to extend beyond the sac to the surrounding tissues, and even the most careful and proper removal of the sac does not free the patient from the malady. Apart from this group of cases, however, the results are satisfactory alike to the surgeon and to his patient.

In acute cases, with the formation of an abscess, our own practice is invariably to make a free incision, to curette thoroughly the wall of the cavity, to pack it with sterile gauze and to let it granulate from below upwards. In other words we treat it like any other acute abscess. The sac no doubt is destroyed, but that is much better than leaving a pyogenic membrane in close proximity to the cornea. As already remarked our experience is that the epiphora following the removal or the destruction of the sac is so inconsiderable as to be of no importance. The watering of the eye which all but invariably is found to persist after the canaliculus has been slit is in our experience always greater in amount and more annoying to the patient.

REVIEWS.

C. Steadman Bull (New York). **Mixed Streptococcus and Pneumococcus Infection of the Orbit and Adjacent Sinuses.** *Annals of Ophthalmology,* October 1908.

Bull's introduction to this paper, read before the American Ophthalmological Society, in July 1908, is in the following words: "The subject of pneumococcus and streptococcus infection has developed great importance and interest during the last two or three years, within which period this particular form of infection has greatly increased in frequency. Osler has called attention to the fact that this increase is especially pronounced in the United States. The conditions attributable to this infection are very numerous and of great variety. We have as yet no certain knowledge of the mode of transmission of the infection, whether lymphatic or hæmatogenous. One of the singular conditions prevailing is the widespread prevalence of pneumococci and streptococci in apparently healthy persons. Clinically, the most marked feature of the infection seems to be the extraordinary variability in the virulence of action of the germs."

In confirmation of the prevalence of such infection, Bull publishes notes of six cases, which he selected from a "goodly number" of cases of severe inflammation of the eye and its adnexa, due to a mixed infection by the pneumococcus and streptococcus. The cases selected were all examples in which the orbit and adjacent sinuses were involved, and were all instances of virulent infection. It was not possible in every instance to trace the channel of infection, but there seems to be little doubt that in four of the six cases, the infection spread from the nose to the orbit and adjacent sinuses.

The clinical notes of these cases form interesting and instructive reading and are worthy of study. An abstract of them would convey but little useful information, and those interested in the subject should obtain Bull's paper. A few general statements may be given here.

All the patients were young: the oldest aged 21 years, the youngest 9 months. In two cases (children at 2 years and 9 months respectively) the symptoms came on very rapidly, with signs of acute orbital cellulitis. In the other four cases the acute symptoms developed in patients with a more or less prolonged history of nasal obstruction, or discharge; in these instances the onset of signs of infection was rapid and severe.

During the acute stage the patients were seriously ill, with delirium stupor in four cases; in only one case, however (that of the child of 9 months) was there excessive pyrexia. In this case the temperature rose to 105·8°.

The duration of the illness varied from 5 to 9 weeks. All the patients recovered, but in one instance the eye was destroyed by panophthalmitis.

Bull emphasises the importance of "immediate and active interference, with free incisions, thorough curetting and irrigation, and a careful search for purulent foci," as well as "great vigilance in watching the cases and searching for new foci on any sudden and rapid rise in temperature." J. B. L.

P. H. Gerber, Professor of Diseases of the Throat and Nose, Königsberg. **The Complications of Frontal Sinus Inflammation.** S. Karger, Berlin, 1909.

This, apparently exhaustive, work of 450 pages is written by an expert rhinologist and as such will appeal more to those who are directly concerned with diseases of the nasal passages than to the pure ophthalmic surgeon. Still it is a matter of great importance that the latter should, as far as possible, make himself familiar with the course and symptoms of diseases of the sinuses, amongst the complications of which affections of the orbit and its contents figure most prominently. Indeed, as the author points out, attention was first directed to the frequency of such complications by ophthalmic surgeons, and statistics drawn up by them show a much higher percentage of complicated cases than that which obtains amongst patients who consult rhinologists. This is due no doubt to the fact that the frequent absence of nasal symptoms, or the want of recognition of the causal connection between the orbital complications and the nasal disease, leads the patient to seek aid from the former rather than the latter.

The chapter on orbital and ocular complications, the only one which directly concerns us, while it contains nothing new, is a very good summary of our knowledge of the subject as it exists at present. It is chiefly based on the writings of ophthalmic surgeons, and Gerber admits that he cannot add anything qualitatively to their work; but that since the number of cases recorded has increased, the statistical results have somewhat altered. The oculo-orbital complications are dealt with in five sections, viz.: the orbit, the adnexa, the eyeball, functional disturbances, and eye complications without any demonstrable connection with the disease of the sinus. It is unnecessary to enumerate all the possible oculo-orbital symptoms mentioned, as all ophthalmic surgeons are well aware of them. It will suffice to allude to some of the points of interest in connection with them. Displacement of the eyeball occurred in 108 out of 178 cases of mucocele, and in 21 out of 38 cases of empyema. Orbital abscess was found 25 times in 70 cases of periostitis and in only 77 out of 319 cases of necrosis. The orbital affection may be the only sign of an otherwise latent disease of the sinus. When the orbital wall is the seat of a mild form of periostitis, narrowing of the palpebral orifice may be the only symptom present or there may be slight swelling of the upper lid without even redness. If there be, in addition, tenderness on pressure not merely of the orbital wall of the sinus, but also of the upper lid, disease of the orbit must be assumed to exist. Diplopia may be one of the first symptoms of sinus disease. It must also be remembered that suppuration in the orbit may continue for some time after the sinus has returned to its normal condition.

Functional eye disturbances have been attributed to changes in the circulation, to fatigue and exhaustion from septic absorption, while by some a nervous reflex origin has been assigned to them. They occur in the form of scintillating scotoma, contraction of the field of vision (mostly bilateral) loss of accommodation, weakness of the lateral recti muscles, fibrillary twitching of the orbicularis, and blepharospasm.

The frequency of orbito-ocular complications in diseases of the frontal sinus may be gathered from the fact that they were present in 454 out of 777 cases of inflammation of the frontal sinus collected by Gerber.

The book concludes with general remarks on treatment. Endonasal methods are as a rule unsatisfactory. The most radical operation is the simplest and best. Killjan's operation in practised hands is excellent and leads in most cases to recovery. The dangers and cosmetic results are discussed and the fatalities after operation criticised. The debatable question as to how far operations on the frontal sinus should enter the domain of the ophthalmic surgeon is not touched upon, nor is any reference made to Axenfeld's views on this important subject.

PARSONS. **The Pathology of the Eye.** Vol. iv, Part ii. Hodder and Stoughton, London, 1908.

MR. PARSONS is to be congratulated on the completion of his great work. The ophthalmic world, and especially the English speaking section of it, is under a great debt to the author. Were it only for the completeness of its literary references the work before us would be invaluable. The younger generation of ophthalmic surgeons is indeed fortunate in having this great English text book as a guide to scientific work in the laboratory and as an aid in the diagnosis of obscure clinical cases.

The present volume begins with a detailed account of the injuries of the eye. Then follow chapters on exophthalmos and enophthalmos. A chapter on panophthalmitis deals chiefly with the bacteriology of the condition and the question of metastatic infection is discussed in an interesting fashion. The opinion is given that many subacute or chronic inflammations of the eye may be metastatic in origin. In discussing orbital cellulitis the frequent spread of the disease from the nasal sinuses is commented upon. A very good account is given of sympathetic ophthalmia and the various theories as to its origin are reviewed with sound judgment. Mr. Parsons, it may be noted, is in favour of the theory of metastatic infection. With regard to the histology we would not personally lay any great stress on the presence of the giant cell or even the epithelioid cell. The characteristic small-cell infiltration of the uveal tract seems to us the most distinctive feature of the disease.

Under the heading of symptomatic diseases of the eye Mr. Parsons discusses those pathologic changes in the eye induced by diseases which primarily attack other parts of the body.

Perhaps the most interesting part of this section treats of vascular disease as it affects the eye, and the author has much that is of interest to say on the question of obstruction of the central vessels. Other important subjects treated of in this section are albuminuric retinitis, optic neuritis, toxic amblyopias and neuroparalytic keratitis. The closing chapter of the book is devoted to heredity and this subject is elaborately treated, the Mendelian theory coming in for a large share of attention. Many interesting family trees are reproduced from the work of Nettleship and other observers.

E. HERFORD (Cassel). **A Contribution to Trachoma Research.**

Klinische Monatsblätter für Augenheilkunde, March, 1909.

HERFORD'S results are simply confirmatory of recently published work. He followed Prowazek's method in the examination of secretion.* Twenty cases of trachoma were investigated in Königsberg and a few more in Berlin. Over a hundred control examinations of secretion from non-trachomatous conjunctivitis and from the normal conjunctiva were invariably negative.

A successful inoculation was made from the discharge of an untreated case of trachoma upon the eye of a dog-faced baboon. Similar attempts upon another animal of the same species, from the same case of trachoma and also from another case, failed. On the second day after the successful inoculation the eye became irritable, with some secretion. There followed a scanty transient follicular development, which subsided spontaneously; there was nothing approaching the picture of human trachoma; but characteristic trachoma bodies were found regularly in the secretion from the 14th to the 35th day after the inoculation.

The first appearance in an infected epithelial cell, treated with the above described Giemsa stain, is a dark blue irregular mass, of the same tint as that of the nucleolus and sharply differentiated from the pale blue protoplasm. The dark blue substance lies typically close to the nucleus, but may be distributed also irregularly in the protoplasm. Fine granules appear and rapidly multiply in these masses and at their edges, coloured more of a purple tint. The blue substance gradually breaks up and disappears, from the centre of the mass outwards. So there results a group of dark granules lying in a space less deeply stained than the surrounding cell substance. It was the appearance thus produced, of a clear mantle covering the nucleus, that led Prowazek to give the name Chlamydozoa to the organisms. The granules multiply more and more, till they occupy nearly the whole cell and distend it. Ruptured cells are also found, with the granules partly scattered in the surrounding secretion.

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* The smear preparation, after fixation in absolute alcohol, is stained for 6 hours in the following mixture: 12 parts of 1-2000 Eosin (freshly prepared), 3 parts of 1-1000 Azur I., 3 parts of 0·8 – 1000 Azur II. It is then washed in water, dried, and mounted in cedar oil.

It is stated that the new trachoma bodies are to be found in all undoubted fresh untreated cases of the disease. They are found also in older treated cases, but sometimes with much difficulty owing to their scarcity. And they are not to be seen in the cicatricial stage. These facts, together with their presence in experimentally induced trachoma, as above, and their absence in other forms of conjunctivitis, make it probable that they are the cause of the disease. Prowazek thinks that they are to be classed in a group of micro-organisms, with those of variola, vaccinia, etc., placed between bacteria and protozoa.

H. Herbert.

Stargardt (Strassburg). **Epithelial Changes in Trachoma and other Conjunctival Diseases.** *Von Graefe's Archiv für Ophthalmologie*, 69, 3.

The author has examined by Giemsa's stain the epithelium of 140 cases of different conjunctival affections.

In 1907 v. Prowazek and Halberstädter investigated the results of trachoma in Orang-Outangs in Batavia and came to the conclusion that the infection lay in the epithelial cells and not in the follicle. They found various minute irregular bodies in the protoplasm of the cell.

Dr. Stargardt, in order to confirm these results, decided to examine first of all the inflamed conjunctival epithelium of cases other than trachoma and to compare the results with cases of recent trachoma. He found the protoplasm of the epithelial cells of the normal conjunctiva by Giemsa's stain showed a fine thread work or honey-comb appearance of a light blue colour. In conjunctivitis there was always very great thickening of the blue stained substance with many small inclusions stained dark blue; these latter were occasionally as large as 3 or even 5 μ and might be confounded with Prowazek's bodies. There were found also in all varieties of conjunctival disease intracellular masses stained red. Sometimes the fine protoplasmic network in certain cells was stained red instead of blue.

Small diplo-bodies were found in all cases of conjunctivitis and are evidently therefore not specific. The smallest of these could be seen only with magnification 1,000. Vacuoles were common, especially in diplo-bacillary conjunctivitis, and minute diplo-bodies were frequently seen in these vacuoles. The nuclei showed changes of every possible character, chiefly mitotic.

The author then compares the above appearances with those he found in two early trachoma cases. The most characteristic appearance in the latter was a semilunar blue-stained body lying with its concavity close to the nucleus of the epithelial cell. The size varied between $^1/_6$ and $^1/_{10}$ μ. These semilunar bodies were sometimes very ill defined, and then appeared as a blue shading partly surrounding the nucleus. The author found these only in the trachoma cases and agrees that they correspond with what was described by von Prowazek. Other changes were also found in these trachoma cases, viz.: thickening of the protoplasmic ground work and various small inclusions stained red. Rarely he found the minute red bodies which von Prowazek considered a likely cause of trachoma. They lay singly in a typical semilunar body or else in masses replacing the semilune completely.

The author is convinced that epithelial changes of great variety occur in all cases of conjunctival disease and that the typical inclusions described by von Prowazek are only found in early trachoma.

E. W. Brewerton.

THE

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, March 11th, 1909.

Mr. W. H. H. Jessop, *Vice-President, in the chair.*

Card Specimens.

A post-mortem Specimen illustrating Oxycephaly.—Dr. George Carpenter.

The skull of an infant, 8 weeks old, had been split vertically in the middle line, showing brain and spinal cord in situ; the latter on one side was intact, but on the other could be seen a hæmorrhage which had been the immediate cause of death. Viewed from the front the face and skull together appeared diamond shaped, and the side view showed flattening antero-posteriorly. The orbital cavities were very shallow, and elongated in the vertical diameter, their margins being egg-shaped and set slightly obliquely. The brain was bent upon itself so that the frontal and occipital lobes were only about 1½ in. apart.

The eyes, during life, were prominent and readily dislocated, and there were no fundus changes. Other deformities were also present, viz. :—6 toes on each foot, and the middle and third finger on each hand were webbed; there was also a ventral hernia above the umbilicus, and one at the umbilicus. Two sisters (since dead) were shown 8 years ago at a meeting of the Society for Diseases of Children (vide Reports, vol. i, p. 110); they had malformed skulls and other deformities of the fingers and toes. The parents were healthy and the third child, 7 years old, was quite normal, while the other children (5 in number) were all affected.

Stereoscopic Colour Photographs (Lumière Process) of Eye Conditions.—Dr. J. Rowan.

Numerous conditions of the eye were depicted by this method, amongst them being lid conditions, glioma of the retina, etc.

A New form of Lantern for the detection of Defects of Colour Vision.—Dr. F. W. Edridge-Green.

By means of a mechanical device the changes of colour and luminosity of the test lamp were much more conveniently effected than in the old form.

Unilateral Optic Neuritis with White Spots in the Retina.—Mr. J. Herbert Parsons.

Rosa A., 16, came on January 30th, 1909, complaining of sudden loss of sight in the left eye, noticed one week previously. She had not been well for some time, and had been treated for anæmia. In her childhood she had had measles, scarlet fever, and anæmia; no rheumatism, no nasal discharge, and no history of tubercle. R.V. $^6/_6$. L.V. hand movements.

The edge of the left disc was found to be blurred, and there was 3D of swelling, the œdema extending into the surrounding retina involving the macula. The veins were somewhat tortuous and dilated, and were constricted where crossed by the arteries. A few small streaky hæmorrhages were seen on the nasal side and below. In a week's time some white spots appeared in the macula forming an incomplete star-shaped figure. Nothing abnormal was found in the urine.

A blood examination showed diminution in the number of erythrocytes and relative increase of white corpuscles.

In another week some whitish, sharply defined spots appeared round the disc, while those at the macula remained the same.

The neuritis gradually subsided under treatment, so that on March 11th all swelling had disappeared, but extending below the disc for about $1\frac{1}{2}$ P.D. was a whitish patch obscuring the lower vessels and tailing off along the temporal artery. The imperfect macula star was still present, and around the disc numerous white spots about twice the diameter of a retinal vessel were seen, which were of a duller colour than those around the fovea. In the extreme periphery below were innumerable small, white, well-defined bright shining spots.

Mr. Parsons discussed the diagnosis and put forward the suggestion of a partial thrombotic retinitis of septic origin, perhaps similar to the retinitis septica described by Roth in his paper published in 1872.

The Chairman suggested a tubercular cause.

Mr. Nettleship thought the spots in the neighbourhood of the disc were deeply situated in the retina, and perhaps choroidal in origin, while those at the macula were undoubtedly retinal.

Optic Atrophy (Retro-Bulbar) with Cerebellar Symptoms in a Child.—Mr. M. S. Mayou and Dr. L. Guthrie.

A male child, aged 9, came under observation on January 14th, 1908, with loss of sight, headache, and unsteadiness of the limbs. The child had suffered from several of the exanthemata, and there was a suspicion of specific history in the family. Three months ago constant frontal headache began, but there was no vomiting. The day before admission the right eye "became suddenly blind," and later in the day the sight in the left began to fail. On admission there was no P.L. in the left, and with the right counting fingers was hardly possible. The left pupil was almost inactive to light, and the right was sluggish, while both discs showed pallor, mostly affecting the macular bundle.

The general examination showed well marked spasticity of the lower limbs, with great exaggeration of knee jerks, and both knee and ankle clonus. Babinski's sign was not present, nor was there any alteration of sensation. The gait was staggering with a strong tendency to fall to the left, but there was no Rombergism.

The child gradually improved in the Hospital, and the tendency to fall to the left, though still present, showed signs of diminishing. The vision recovered only to counting fingers at 6 ft. in both eyes, both discs were atrophic, and there was a large central scotoma.

Dr. Batten thought the symptoms pointed to internal hydrocephalus.

? Solitary Tubercle of the Iris in both eyes.—Mr. W. H. H. Jessop.

A female patient had erythema nodosum, then facial paralysis, and following this iritis in both eyes. This quieted down, and 3 days ago she returned exhibiting the present condition. The vision was $^6/_9$ in one eye and $^6/_6$ in the other; there was K.P. of the mutton-fat type, and several whitish nodules could be seen in both irides, situated at the periphery.

Mr. Nettleship described similar cases, and threw out the suggestion that some of these chronic inflammatory cases might be caused by some hitherto unrecognized condition other than syphilis or tubercle.

Mr. Doyne considered that the fact of the nodules being present in both eyes pointed to a syphilitic origin rather than a tubercular.

PAPERS.

Congenital Anterior Staphyloma.—Mr. E. Treacher Collins.

A child, aged one month, was brought for treatment on August 14th, 1907, with the right eye unduly prominent, a condition which had been noticed immediately after birth. There was nothing in the history of the confinement likely to account for the appearance.

The right cornea was found to be opaque, vascular, and staphylomatous, the greatest density being in the central region; the lids were incapable of closing over the projection. The iris appeared to be in contact with the back of the cornea throughout. There was also a slight haziness in the left cornea. During the next 14 months the prominence of the right cornea increased, and on October 14th, 1908, it was decided to eviscerate the eye, the anterior part, containing the cornea, part of the ciliary body, and lens, being preserved for examination purposes. The macroscopical appearance bore out what was seen clinically; the lens was clear, except at the anterior pole, where a conical projection was visible.

By microscopical examination the following points could be observed: the epithelium was thickened and in places horny; there was irregularity of the layers of fibrous tissue composing the cornea, with some increase in the cellular elements; absence of Bowman's membrane, Descemet's membrane, endothelium, and the ligamentum pectinatum; posterior surface of the cornea lined by a double layer of pigment epithelium, with a gap corresponding to the pupil, eccentrically placed; between this layer and the posterior surface of the cornea scattered collections of spindle-shaped cells representing the remains of iris tissue; evidences of dislocation forward of the uvea, commonly met with in congenital staphyloma.

After shewing lantern slides illustrating the above points by means of sections, Mr. Collins discussed the subject in the light of similar cases described by others. He referred to those of Parsons (*Trans. of Oph. Soc.*, vol. xxiv, p. 47) and Coats (*Trans. of Oph. Soc.*, vol. xxvi, p. 36), as well as to a paper in *The Ophthalmoscope*, vol. iv, p. 214, by Sydney Stephenson and Rosa Ford. He sought to shew that the views generally expressed regarding prenatal ulceration and perforation were not borne out by the microscopical findings nor were they consistent with the length of time usually necessary for formation of a staphyloma in ordinary postnatal inflammatory perforation. Mr. Collins held that the abnormality was due to failure of development, a view which was supported by the frequent presence of associated deformities in other parts, as well as the occasional appearance of a mass of dermoid tissue in front of the staphyloma, to which the thickened horny epithelium noticed in the present case was somewhat allied.

He held that the absence of Descemet's membrane was decidedly against an inflammatory theory, since in postnatal perforation some parts of it were invariably preserved. He thought that the entire phenomenon could be explained by atypical development of the mesoblastic tissue which insinuates itself between the lens and the surface epiblast; this fails to become differentiated into its three parts, viz.: an anterior non-vascular layer, a hyaline membrane, and a posterior vascular layer.

In conclusion, a summary was given of the different malformations which may arise from aberrations in development of this particular part of the mesoblast, with references to the literature on this point.

Mr. Parsons said that although he considered the inflammatory theory the more probable one, yet he did not exclude the possibility of arrested development as a result of such a process taking place in utero.

Mr. Coats thought that the displacement forward of the uvea could not be satisfactorily accounted for on Mr. Collins's theory, as the parts involved were all well formed and did not shew any lack of differentiation. He mentioned the striking fact, noticed in his own case, of the presence of lens matter in the corneal tissue; and he also questioned the formation of dermoid tissue from mere exposure.

In reply, Mr. Collins remarked that he felt no arguments had at present been put forward which negatived his theory of arrest of development.

Some New Pedigrees of Eye Disease.—Mr. Nettleship.

Mr. Nettleship contributed seven new pedigrees of different varieties of hereditary cataract, in each case containing four generations.

(1) Lamellar cataract; twenty-four members were affected in the four generations, six being in one family. In some the defect was associated with a goitre, and in others with congenital ptosis. Two of the patients had been operated on (optical iridectomy) with considerable benefit, and three others needled, but the subsequent history of these was not obtainable.

(2) and (3) Coralliform cataract, of which there were twenty-two affected in one genealogy and five in the other; there was only one consanguineous marriage in one family, and no other defects or degeneracies were found in either.

The other four were generations in which senile and presenile cataract shewed itself, some of them illustrating the phenomena of anticipation. In one family an element of insanity was introduced.

A very thorough description of each case, where examination had been possible, accompanied this paper.

On So-called Temporary Artificial Colour-blindness.—Dr. F. W. Edridge-Green and Mr. C. Devereux Marshall.

The authors of this paper conducted experiments to test the value of the conclusions arrived at by Professor Burch and published in the Philosophical Transactions of the Royal Society for 1898. This observer used a beam of sunlight from a heliostat, decomposed it by prisms and concentrated each colour on his eye by a lens of 3 in. focus. He found that by continued exposure of the eye to light of one colour all direct sensation of the colour used was for a time abolished. His most important observation was that fatigue of the retina by yellow light produced partial blindness for red and green, a fact which gave strong support to the Young-Helmholtz theory of colour vision.

Dr. Edridge-Green and Mr. Devereux Marshall criticised Professor Burch's method of producing fatigue as too violent and dangerous. They exposed themselves to the pure yellow light of a sodium flame for periods of 3 to 15 minutes and the results of their investigations differed in many respects from those of Professor Burch and tended to shew that the psycho-physical theory of colour vision of Dr. Edridge-Green was upheld, while neither the Young-Helmholtz theory nor that of Hering would account for the phenomena.

At a Special Meeting of the Society on Friday, March 12th, Mr. Priestley Smith in the Chair, the following resolution was moved :

> "That this meeting, specially convened to consider the question, is of opinion that amalgamation of the Ophthalmological Society of the United Kingdom with the Royal Society of Medicine is desirable, and hereby authorises the steps necessary to such amalgamation being taken in due course."

To this an amendment was submitted :

> "That any further consideration of the amalgamation of the Ophthalmological Society with the Royal Society of Medicine be postponed until every member of the former Society has had the opportunity of expressing his opinion for or against such amalgamation, and that a special committee of the Society be appointed to draw up a statement or statements to be sent to each member with his voting paper setting forth the alleged advantages and disadvantages of the proposed amalgamation."

After a prolonged discussion, in which Mr. George Mackay, Mr. Nettleship, Sir Anderson Critchett, Sir Henry Swanzy, Mr. Jessop, Mr. Lawford, Mr. Parsons, Mr. Collins, Mr. Stephenson, Dr. Hawthorne and others took part, the amendment was carried by 53 votes to 42.

MALCOLM L. HEPBURN.

SOME PROPERTIES OF THE CONVEX LENS.

By Major G. F. ALEXANDER, R.A.M.C. (retired).

THE following are considered: firstly, the general statement for the magnifying power of a convex lens.

Secondly, the statement of Landolt that "in Hypermetropia when the distance for which an eye is adapted by means of a convex lens is less than double the focal distance of the lens, the lens will require to be stronger in proportion as it is farther from the eye, while when the distance for which it is adapted is greater than double the focal distance of the lens the lens will require to be weaker in proportion as it is farther from the eye."

Thirdly, the statement of Landolt that "it is quite inaccurate to say that Presbyopes put their spectacles at the end of their nose in order to increase their effect: on the contrary they thereby weaken the effect of the glasses. If the Presbyope sometimes moves his spectacles towards the end of his nose it is because on so doing he places them on a lower level than the eyes and is thus at the same time able to incline the glasses a little."

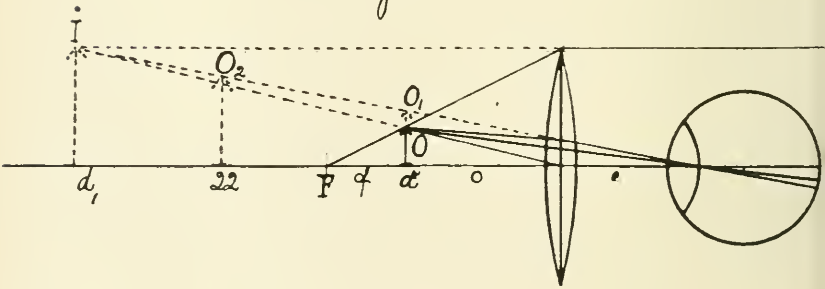
The first two statements are in no way erroneous, but, I consider, faulty in being limited in their application: in regard to the latter part of the third the eminent French savant seems to have fallen into error. Certain preliminary remarks are necessary for the considerations which follow:—

1. As the size of the retinal image varies directly with the size of the object and inversely with its distance, in order to formulate an idea of the size of an object from that of its retinal image the mind takes cognizance of

its distance, which it judges chiefly by the amounts of accommodation and convergence required for it and the clearness with which details are seen; consequently when it is within the ranges of these factors the apparent size of an object varies directly both as the visual angle subtended by it and its distance, *i.e.*, if A be the visual angle, D the distance of the object, and O its apparent size, O varies as A × D. When objects are at the same distance their apparent size therefore varies solely as the visual angle, and the same applies to objects viewed through a magnifying glass strong enough to eliminate the element of distance as far as the visual angle subtended by the virtual "object" goes, this being always considered at the normal near point. The apparent increase in the size of objects viewed through a convex lens thus depends on two factors, one physical, viz., the increase effected in the visual angle and the other mental, viz., the distance at which the object is judged to be, *i.e.*, to which the retinal image is "projected," and magnification may be effected by the influence of the former alone or the two combined.

2. Variation in the size of the visual angle: in fig. 1

Fig 1.

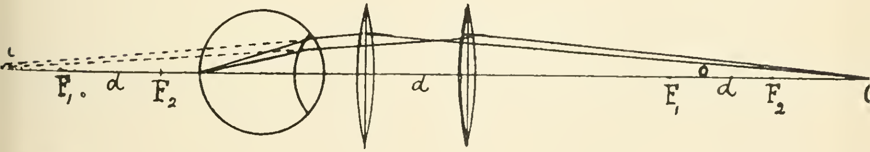


let O be an object distant o from the lens, I its virtual image at the near point of the eye distant d_1 from it, e the distance of the eye from the lens, and f the focal length of the lens: as $d_1 - e = \frac{of}{f-o}$, $d_1 = \frac{of}{f-o} + e$ and as $I = \frac{Of}{f-o}$ the tangent of the visual angle subtended by I, viz. $\frac{I}{d_1} = \frac{Of}{f-o} \div \left(\frac{of}{f-o} + e\right) = \frac{Of}{f(o+e) - oe}$, and the tangent of the visual angle subtended by O being $\frac{O}{o+e}$ the visual angle subtended by the object is increased $\frac{Of}{f(o+e) - oe} \div \frac{O}{o+e} = \frac{f(o+e)}{f(o+e) - oe}$ times. Now as long as the object remains at upwards of the distance of the normal near point, viz., 22 c.m. from the eye, it is projected to the distance at which it was judged to be when seen without the lens, hence its magnification O_1 is that of the visual angle. By giving values to f, o, and e, in the above formulæ as long as o and e are less than f the following are deducible: (*a*) if either of the distances o or e remains constant the size of the visual angle varies inversely with the other, and (*b*) if the distance of the object from the eye remains constant the magnification of the visual angle and hence of the object increases as o and e approach equality and is not influenced by interchanging them.

1st Consideration. The formula for the magnifying power of a convex lens in universal acceptance is as follows: if d be the "nearest distance of distinct vision," and f the focal length of the lens, its magnifying power is expressed by $1 + \frac{d}{f}$. The "nearest distance of distinct vision" is obviously that of the average near point of vision which may be taken as 22 c.m. We owe this formula to mathematicians who could hardly be expected to take into account variations in the accommodation; but it is surprising to find it endorsed by such a brilliant medical mathematician as the late Samuel Haughton, as it restricts the individual to the exercise of 4·5 D. of accommodation, and thus fails to satisfy the conditions in which he has not this amount available or is capable of exerting much more. It is obvious that when the eye is close to the lens the greater is the amplitude of accommodation the nearer the object can be approached, as its virtual image advances with it, and hence, by preliminary remark 2(*a*), the greater is the visual angle. The object is therefore approached as near as the amplitude of accommodation available will permit, *i.e.*, till its virtual image I_1 arrives at the near point of vision of the eye: let the distance of this from the eye be d_1, and let d be the distance of the object from the eye, f the focal length of the lens employed, O_1 the object as magnified by increase in the visual angle, and O_2 the "apparent object" at the normal near point. The mistake writers on this subject have so often made is in drawing I in coincidence with O_2. As $o = \frac{f(d_1 - e)}{f + d_1 - e}$, $I = \frac{Of}{f - o}$, and $O_2 = I \times \frac{22}{d_1}$, $O_2 = \frac{Of}{f - o} \times \frac{22}{d_1}$, and the magnification $\frac{O^2}{O} = \frac{f}{f - o} \times \frac{22}{d_1} = \frac{f}{f - \frac{f(d_1 - e)}{f + d_1 - e}} \times \frac{22}{d_1} = \frac{22(f + d_1 - e)}{f \times d_1}$: if e is neglected this becomes $22\left(\frac{1}{f} + \frac{1}{d_1}\right)$ or if the strength of the lens be D and the amplitude of accommodation A, $(D + A) \times 22$. If 4·5 D. of accommodation were exerted, *i.e.*, if d_1 were 22 c.m. the formula becomes $1+\frac{22}{f}$ as stated; but say an object is viewed through a lens of 10 D. by an eye at first exercising no accommodation and successively 1 D., 2 D., 4·5 D. and 8 D. the corresponding degrees of magnification are 2·2, 2·4, 2·6, 3·2 and 4.

2nd Consideration. As will presently be seen, this statement is true only for an infinitesimally small movement of the lens; but becomes inaccurate when we have any considerable extent of its movement. As the real conjugates of all points falling within twice the focal length of the lens during its movement move over a greater distance than the lens, and the conjugates of all points remaining beyond twice its focal length over a less distance than the lens, it follows that for a given movement of the lens there is a point for which if the eye were adapted before the movement it would remain adapted after the movement, *i.e.*, rays from which would continue focussed on the retina without any change in the accommodation. This point may be termed the neutral point as any other within it could only be focussed on the retina by increase of accommodation and any other beyond it by relaxation of accommodation. The neutral point is determined as follows: In Fig. 2

Fig 2.



let 1 be the correcting lens close to the eye, and F_1 its foci, 2 the lens removed a distance d and F_2 its foci, f the focal length of the lens, O the neutral point at a distance o from F_1, and I its conjugate at a distance i from F_1. As F_1 is the far point of the eye rays emanating from O and directed by the lens to its conjugate I can only be focussed on the retina by an effort of accommodation, or in the absence of accommodation due to aphakia, cycloplegia, etc., by increasing the strength of the correcting lens by one whose focal length is the distance from it of O. Now as O and I are conjugate, rays emanating from O can be focussed at I when o and i are interchanged, *i.e.*, when $d = o - i$, *i.e.*, as $i = \frac{f^2}{o}$ when $d = o - \frac{f^2}{o}$, from which if given any two of the quantities d, o, and f we can calculate the third. Now as in the second position of the lens the conjugate of any point within O falls beyond I and that of any point beyond O falls within I it follows that had the eye been adapted by an increased effort of accommodation for the former before the lens was removed the distance d the focussing effect of the lens would have been lessened by its removal, while had the eye been adapted by a decreased effort of accommodation for the latter the focussing effect of the lens would have been increased by its removal. From the equation $d = o - \frac{f_2}{o}$ it follows that the less d is the more nearly $o = f$, *i.e.*, the nearer O is to twice the focal length from the lens. When the eye has no power of accommodation the distance from the focus of the lens before its movement, o, of the point O for which it becomes adapted by a given movement of the lens, d,

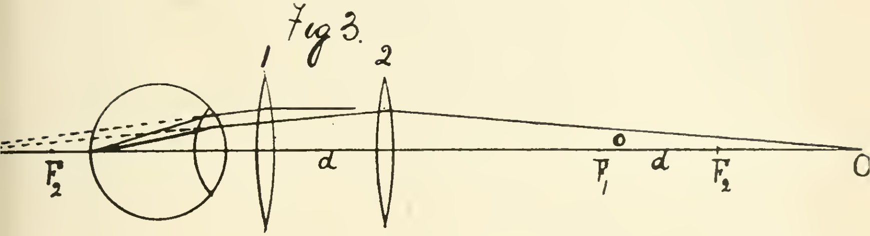


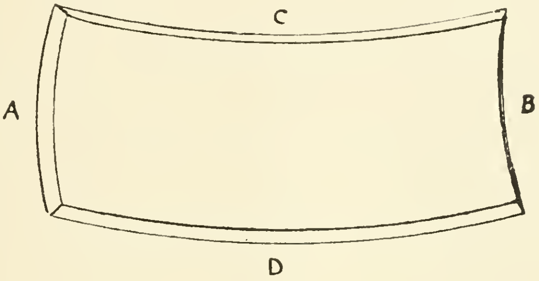
fig. 3, or the distance to which the lens must be moved to adapt the eye for a point at a given distance from the eye, is obviously found from $(o-d)\ d=f^2$: thus in aphakia when the hypermetropia is corrected by a $+10$ D. at 2 c.m. from the eye the individual is able to read at the distance of 40 c.m. from his eye, *i.e.*, 28 c.m. from the focus of the lens by removing it to a distance from $(28-d)\ d=100$, viz., 4·2 c.m. which has thus practically the same effect as strengthening the lens by 2·5 D.

3rd Consideration. If the glasses correcting the presbyopia are moved some distance from the eyes (*a*) their focussing effect is lessened, *i.e.*, the image of an object looked at is thrown behind the retina, as the approach of the object to the lens is accompanied by a greater movement on the part of its virtual image which thus advances nearer to the eye, so that for the maintenance of distinct vision either the accommodation must be increased or the object moved farther from the eye, a distance which approaches that to which the lens was removed the less is the amplitude of accommodation and equals it in the case of absolute presbyopia; (*b*) their magnifying effect is increased. If there is sufficient accommodation in reserve to enable the object to be seen distinctly without removing it from the eyes the visual angle is enlarged on removing the lenses from the eyes (prelim. 2b): if, on the other hand, the object has to be removed some distance farther from the eyes, the diminution of the visual angle thereby produced (prelim. 2a) has no effect on its apparent size, being, by prelim. 1, mentally neutralised by the increase in its distance; but the increase in the visual angle produced by the removal of the lens has then as before the effect of increasing the apparent size of the object. It is on this account, viz., to obtain magnification, that presbyopes are in the habit of sliding their glasses down the nose or holding their lorgnettes at a distance, being however only able to maintain this benefit for a short time, as, even if the illumination is sufficiently good to enable the book, etc., to be held at a greater distance, and thus relieve the ciliary muscle, asthenopia is readily induced by the prismatic action of the glasses if correctly centred for the nearer distance and the disturbance in the relationship of accommodation to convergence, the former being called upon for an increase or the latter undergoing diminution while the other remains the same.

TORIC LENSES.

A "Toric" surface is one on which there is a grinding which is equivalent to that of two cylinders of different radii of curvature and with their axes at right angles to one another. A familiar example of a toric surface is that of an ordinary bicycle tyre, where a section of the tyre itself is roughly a portion of a cylinder and the rim of the wheel forms the surface of the second cylinder with an axis at right angles to that of the tyre.

For grinding toric surfaces for spectacle lenses, the tool—which may be either concave or convex—is shaped similarly to a portion of a bicycle tyre, each tool having a definite difference between the radii of curvature in the two directions AB and CD.



This difference is equal to the amount of cylinder prescribed in the lens, a different tool being required for each amount of cylinder from 0·12 D. upwards.

The machine on which toric lenses are ground consists of a rest which holds the tool firmly. The glass blank is attached by pitch to another rest which is fixed at the end of a spindle. This spindle, when placed in the machine, is given a to-and-fro motion in one direction only, viz., AB, across the tool, and at the same time is free to move up and down, but by means of a spring is always kept pressed against the tool. The second surface of the lens is given a spherical grinding in the usual way.

The usual form of toric lens is one which is ground on either a plus or a minus 6-dioptre base curve, the base curve being the name applied to the toric surface and not necessarily to the inner surface of the lens. The usual form, however, is being superseded by a system of torics in which four complete sets of tools in both plus and minus are used, the least curvature of the different bases being respectively 3, 6, 9, and 12 dioptres.

By means of such a system a toric lens of practically any depth may be worked.

Thus taking for example a lens +2·5 D. sph. −1·0 D. cyl. axis 90° if ground on a:—

(1) *plus* 3 *base* the grinding on the front would be +3 D. cyl. axis 90° together with +4 D. cyl. axis 180° and on the inside of the lens a spherical curvature of −1·5 D. would be ground.

(2) *minus* 3 *base* the grinding on the inside would be −3 D. cyl. axis 180° together with −4·0 D. cyl. axis 90° and on the outside of the lens a spherical grinding of +5·5 dioptres.

(3) *plus* 6 *base* the outside would be +6 D. cyl. axis 90° and +7 D. cyl. axis 180°, and the inside curve would be −4·5 D. sph.

(4) *minus* 6 *base* the inside would be −6 D. cyl. axis 180° with −7 D. cyl. axis 90°, and the outside curve would be +8·5 D. sph.

(5) *plus* 9 *base* the outside would be +9 D. cyl. axis 90° and +10 D. cyl. axis 180°, and the inside curve would be −7·5 D. sph.

(6) *minus* 9 *base* the inside would be −9 D. cyl. axis 180° with a −10 D. cyl. axis 90°, and the outside curve would be +11·5 D. sph.

(7) *plus* 12 *base* the outside would be +12 D. cyl. axis 90° with a +13 D. cyl. axis 180°, and the inside would be −10·5 D. sph.

(8) *minus* 12 *base* the inside would be −12 D. cyl.

CHARLES BELL TAYLOR, M.D., F.R.C.S. (Ed.).

axis 180° with a -13 D. cyl. axis 90°, and the outside would be $+14{\cdot}5$ D. sph.

Thus by this system the inside curve of the lens may be varied from $-1{\cdot}5$ dioptres to -12 dioptres for the one particular strength chosen.

OBITUARY.

CHARLES BELL TAYLOR, M.D., F.R.C.S. (Ed.).

By the death of Dr. Charles Bell Taylor of Nottingham, the world loses a man who was more than a mere individual: his was a marked and strong individuality. Taylor was a tall, striking looking man, of commanding aspect, who dominated his patients, and it must be admitted occasionally terrified them not a little. His command over himself was perfect, and it was this which gave him his command over others. He held strong views on the subject of food and eating, was an abstainer not merely from alcohol and tobacco but even from tea and coffee: his rule was to take only two meals per day. He lived to a good old age, and until the last was never ill, and never off work, operating coolly and steadily, even when fully eighty years of age. His habit was always to operate for cataract by artificial light, and without any "qualified" assistant: his section was made exactly in the corneo-scleral junction, and he preferred to omit the iridectomy. In many ways and under many circumstances he made his vigorous personality felt. In particular, he was a strenuous opponent of any interference with the right of judgment, a view which he carried to an extent which brought him into disfavour with some members of the profession, for he maintained and openly advocated the right of every man to decide for himself as to vaccination and vivisection.

Taylor cannot be said to have been a favourite with the profession: his independence of spirit and the fearless outspokenness of his particular opinions precluded that, but his was a strong personality. He was not a scientist or an authority, but a clever and very hardworking practitioner and an eminently skilful operator: to the poor and to the lower animals also he was kindness itself.

It is with deep regret that we also record the death of Mr. Simeon Snell, of Sheffield, an obituary notice of whom we hope to insert in our next issue.

REVIEWS.

"A First Study of the Inheritance of Vision and of the Relative Influence of Heredity and Environment on Sight." By Amy Barrington, of the Galton Eugenics Laboratory and Karl Pearson, F.R.S. Dulau & Co.

The appearance of this paper,—one of the memoirs proceeding from the Francis Galton Eugenics laboratory,—is welcome as a recognition from the students of heredity of how great importance accurate ophthalmic measurements may be in the elucidation of their science. It may also serve to some extent as a guide to the ophthalmologist who engages in such work in the selection and arrangement of his statistics. The material which the compilers of the paper have employed comes from the following sources:—

Steiger's "Statistical Investigations on Corneal Astigmatism and Corneal Refraction" (the more recent of which have appeared in *Zeitschrift für Augenheilkunde*, 1906 and 1907).

A Paper by the present reviewer on "Errors of Refraction among Elementary School Children in London." (*British Medical Journal*, 1906).

Another by Rowan on "The Eyes of Glasgow School Children." (*Educational Times*, 1906.)

"The Report of the Education Committee of the London County Council," 1904.

"A Report by the Edinburgh Charity Organisation Society on the Physical Condition of 1,400 School Children" (1906).

While the complaint is made that in some of these papers the statistics are not compiled in a way quite satisfactory to the scientific statistician, the ophthalmologist may fairly retort that valuable as the memoir is, it would have been still more so had the authors been acquainted with some ordinary clinical facts well known to every ophthalmic surgeon. For instance, there is evidence * that the authors do not realize the fact that while the curvature of the cornea is the main element in determining astigmatism, the variations in corneal curvature have but a very minor share in determining the total refraction of the eye. Again, on p. 33, we read "As far as it is legitimate to draw conclusions at all, our Edinburgh data would thus lead us to say that a great deal of hypermetropia, hypermetropic and mixed astigmatism disappears, probably owing to growth between 6 and 10, thus swelling the number of emmetropic eyes." It is indeed possible, as Steiger has shown, that slight degrees of astigmatism may disappear owing to alterations of corneal curvature, but that an astigmatism sufficient materially to affect vision can even become emmetropia there is neither any evidence to prove, nor is it reasonable to suppose that it happens.

It is, therefore, perhaps, scarcely surprising that while some of the general conclusions arrived at should appeal to the ophthalmic reviewer as sound, this cannot be said of the work as a whole. Of the sound conclusions, that concerning corneal astigmatism may be cited. It is certainly inherited, but the data to hand are as yet insufficient to determine to what extent. "Steiger has enormously advanced the conception of what the ophthalmologist can do for heredity by taking the ophthalmic characters of the relatives of his patients." But the fact that his statistics were derived primarily from patients prevents them from being applicable to the whole population. "There is a splendid field," we are told, "for a man who will measure the corneal astigmatism in a non-selected population."

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* *e.g.*, on p. 5 and on p. 29.

With regard to corneal refraction apart from astigmatism, the statistics relating to which have been treated by Steiger with great elaboration, the conclusion is "that corneal refraction is inherited at the same rate as other physical characters in man,"—a conclusion which, of course, has very little bearing on the inheritance of refractive conditions in general. Later on, however, under the heading "Heredity as a factor in Keenness of Vision," we learn "that the physical characters of the eye are hereditary qualities, and that the intensity of inheritance is probably exactly the same as that for other physical characteristics in man."

In a section headed "Keenness of Vision and Refraction" we are given a chart which proves "how much more influence myopia has on keenness of vision than hypermetropia." As the test for keenness of vision appears to have been ability to recognise letters at a distance without glasses, it would hardly occur to the non-statistical mind that any chart was necessary to prove the point.

When we come to the relation between age and refraction, the matter is decidedly more contentious. My own statistics tend to prove that many children who start with hypermetropic astigmatism go on to the stage of mixed astigmatism, and that finally a certain proportion of them become myopic in both meridians. The authors of the memoir question my statistics on the grounds (1) that the percentages ought to have been based on the numbers examined at each age,—but this is exactly what they are based on; (2) that my figures show a far smaller proportion of ametropia in the London children than the Edinburgh and Glasgow figures show; but to compare statistics of this sort with each other it is absolutely necessary that the methods of selection and standards adopted by the different investigators should be identical, and this was by no means the case. The Glasgow standard, for instance, put the limit of negligible hypermetropia at 1 D while the London one put it at under 2 D. Indeed the London statistics were never intended to serve as a measure of the actual extent to which ametropia prevails. (3) The Edinburgh and Glasgow statistics do not apparently confirm my argument as to the tendency of astigmatism to become gradually more myopic. In answer I can only point to the fact that the number of ametropes examined in Edinburgh and Glasgow together was less than one-third of the number examined in London. The number of ametropes on which the statistics are based is: Edinburgh 408, Glasgow 115, London 1,940.

The proposition that myopia increases with age is not, indeed, contested by the authors of the memoir, but they vigorously attack what they call (quoting a phrase of Fuchs's) the "hot-bed theory," that school life is responsible for the increase, as unproved. Cohn's well known arguments are adversely criticized, and a new conclusion drawn from his old figures, namely that the increase of myopia with age is quite independent of the influence of school life. The authors go further and maintain that the increase of myopia and myopic astigmatism "does not balance the total gain due to rectification by growth; thus in leaving school there are more normal sighted individuals than on entering it." Here we seem to scent a fallacy, for no ophthalmic inspector of school children would be found to maintain that the decrease of hypermetropia in young children was sufficient to balance the increase of myopia in older ones. Hypermetropia in young children is a normal condition. Myopia is always abnormal.

Perhaps the most interesting part of the paper is that bearing on the influence of environment on sight. After collating the evidence as to number of people per room of the home, economic condition of the home, and physical and moral condition of the parents, the conclusion arrived at is that "normal vision is on the whole *slightly* associated with overcrowding, bad economic conditions, and morally defective parentage." This paradoxical result is employed by the authors to fortify their main conclusion that the environmental factor is of no importance compared with the hereditary one as far as vision goes. The explanation which commends itself to the reviewer is inconsistent with this conclusion. It is an incontestable fact that corneal nebulæ from phlyctenular disease are far more common among the children of the very poor and this tends to render their sight worse than normal. On the other hand, the fact that children with a bad environment are on the average less studious than those with a better one is an influence unfavourable to the increase of school myopia among them. In this case, therefore, it is not true to say that the environmental factor is of no importance, but rather that it is manifold. When the test is acuity of vision at a distance of six metres the resultant effect may appear to be nil.

The memoir closes with a moral which, though the authors would certainly not admit it, betrays their eugenic bias: "Pay attention to breeding, and the environmental element will not upset your projects. Improve to the utmost your environment, and breeding will lay low your schemes."

A. Hugh Thompson.

Presas (Barcelona). **A Modified Decimal Optometric Scale.** International Congress, Madrid, 1903. *Annales d'Oculistique*, October, 1908.

In the opening paragraphs of this communication Presas comments upon the difficulty found by ophthalmic surgeons at two previous congresses in arriving at a universal unit for the measurement of visual acuity.

It is pretty well agreed that the unit of 5′ proposed by Giraud-Teulon and Snellen in 1862 is too small, and Sulzer, in his communication to the Ophthalmological Society of Paris, proposed a unit at least ten times as large, based on the metric system, viz., the degree. Quite on a par as regards difficulty was the choice of the "Dioptre" last century as the unit of refrangibility of lenses which were previously measured in inches, a unit manifestly too small.

Once the angular unit of the measurement of visual acuity be adopted the choice of the type presents little difficulty, provided always that the latter allows for the minimum visual angle in its construction; whether the type be geometrical or in the form of a letter it matters not, provided it be described in a square of sides divided into $^1/_5$'s and that the character of the letter be formed of 5 strokes of equal thickness whether black or white. The Latin tongue permits of this in the letters E F L P T X Z. Presas' opinion is that it would be better to use a simple geometrical figure such as a cross, and to give this an oblique position so as to facilitate the estimation of astigmatism. A disc of the same diameter as the square might be added to one arm of the cross, and the figure would thus be made up of four squares and a disc, each providing the minimum visual angle.

The choice of the type is however a point that might be left open, granted always that certain conditions necessary to secure a standard gradation of visual acuity be fulfilled, so as to make the unit universal, which is what is aimed at.

Without the adoption of such a standard of progression, all units for the measurement of visual acuity remain worthless. It was this point around which, more than perhaps any other, the greatest discussion centred at the Congress. Presas from a careful analysis finds that considerable differences exist between the terms of an arithmetical progression using the ordinary formula $V = \frac{d}{D}$ and that arrived at by using the visual angles after the method of Sulzer.

It is important then to settle which method be adopted, and as the method using the visual angles does not fulfil the conditions required by the formula $V = \frac{d}{D}$, that based on the distance was adopted by Presas as being the only exact one.

After discussing the etymology of the various terms proposed as a name for the new unit, Presas prefers "gonioptique" (or, shortly, "gon") from *γονία* and opticus, as indicating the angle under which a body is seen. Dioptre is the analogous term in refraction.

The higher degrees of visual acuity are determined by using the ordinary formula $V = \frac{d}{D}$ following an arithmetical progression, by distances of 5 metres. The visual angles subtended by the rays at 10, 15, 20 metres are inversely proportioned to the distance, so that 2 gon. = 0·5°, 3 gon. = 0·33°, 4 gon. = 0·225°, the method of calculation being analogous to that of ascertaining the focal length of a lens. The lower degrees of visual acuity are ascertained by bringing the unit, fixed on a card, to which is attached a metric ribbon, nearer to the patient. It will be noticed that the visual angles are only strictly inversely proportional in the case of the smaller angles.

Thus in the 100's 0·01 gon. = 61·69° instead of 100°, but in the 10's 0·1 gon. = 10°.

For testing the near vision the type is reduced to $^1/_{10}$ of its ordinary size, and for this purpose Presas prefers white letters on a black background, as the type stands out much better and keeps longer. The grey ground he finds best for distant vision and it allows of a more accurate estimation of the central vision for colours.

In conclusion he advises (1) the universal adoption of the degree as the angular unit of measurement of the visual acuity, a unit which is sufficiently large to measure it in all its gradations. (2) Arithmetical progression by distance according to the formula $V = \frac{d}{D}$ as the only exact method for the construction of the optotype, so that measurements of the visual acuity may be universally the same. (3) That whereas the choice of the type may be left to each individual surgeon it would be advisable to adopt some such geometrical figure as, for example, a cross, and that the ground be black with white letters for near vision and neutral gray with black, red and green letters for distance.

J. BURDON-COOPER.

SAUVINEAU. **A Centesimal Scale for the Measurement of the Colour Sense.** *Annales d'Oculistique*, July, 1908.

SAUVINEAU in this article describes his method of quantitative determination of the central vision for colours and measurement of central scotomata in railway employés and other artisans. He makes use of the lantern. The distinguishing feature of his method is that the diaphragms through which the different colours are viewed bear a definite relation in point of area to each other. In Sauvineau's scale there is a 10% difference.

It was found from an examination of 150 patients with normal or corrected vision that the majority could perceive red, yellow, green and blue light from a lantern 5 metres distant placed in a darkened chamber (the patients being in ordinary daylight) when the diaphragm through which the light was visible was 1 mm. in diameter. There were some exceptions to this, notably when the test was blue light the diaphragm had to be larger, this colour being less easily perceived than the others. Accordingly an opening of 1 mm. diameter was taken as the unit by which to measure quantitatively the patients' colour vision and a centesimal scale constructed from this.

The different diaphragms have a diameter measuring from 1 mm. to 10 mm. A patient who could only distinguish red light when the diaphragm was 10 mm. diameter could only have $^1/_{10}$ vision for red possessed by a patient who could see this colour through an opening of 1 mm. With a 3 mm. diaphragm the degree of colour vision would be $^8/_{10}$. In Sauvineau's lantern the diaphragms are cut on a revolving disc so that they can be brought successively in front of the light. Between the diaphragm and the light is another disc carrying coloured glasses, so that any desired colour can be brought in front of the light. A third wheel carries mixed colours. For central scotomata, diaphragms smaller than 1 mm. are used.

J. Burdon-Cooper.

Gifford (Omaha). **Sympathetic Ophthalmia after Evisceration and Mules' Operation, with a Case.** *Trans. American Acad. of Ophthal. and Oto-Laryngology.* 13th Annual Meeting, 1908.

In a paper which is well worth perusal by every Ophthalmic Surgeon Gifford reports a case of sympathetic ophthalmitis occurring in one of his patients, after a modified Mules' operation. His description of the case is as follows: "J.M., æt. 45, struck R. eye with a sunflower stump Sept. 15, 1903. He was seen by me 6 weeks later, with a large triangular scar of a perforating wound in the sclera, down and out: a.c. shallow: lens cloudy: no fundus reflex: deep congestion: projection faulty. As in spite of treatment the congestion continued, Mules' operation was performed Dec. 17, a glass ball being put through an opening in the sclera above the cornea, and the cornea left in place. He returned July 28th, 1904, saying that the other eye, which was normal when I first saw him, had become sore and the sight dim 3 days previously. No premonitory symptoms nor trouble of any kind with the stump. I found the latter to be in apparently excellent condition without any signs of irritation."

Recovery to almost normal vision followed active treatment, but the sight was lost subsequently from a very intractable and in some respects unusual form of glaucoma. Unfortunately the excised stump was lost, so nothing definite was known of the intra-ocular conditions.

In commenting on his case Gifford writes:—"It makes a great difference whether one of these rare accidents occurs in a man's own practice or in that of someone else. Reading about such things produces little effect . . . . . But when a man has one of his patients go blind, after a somewhat unorthodox operation it is hard to escape some remorse at not having stuck more closely to conventional lines."

In an endeavour to "decide whether Mules' or any other implantation operation is justifiable," the author has collected all available records of sympathetic ophthalmitis following Mules' method of operation. For estimation of the danger of this procedure, compared with ordinary evisceration and Frost's operation, he gives the published cases of sympathetic disease after operation by these methods. Brief notes are given of each case, and references to the original report. The figures are as follows: *Fourteen* cases of sympathetic ophthalmitis after Mules' operation, *nine* after ordinary evisceration (without introduction of artificial vitreous), and *three* after Frost's operation. As to the severity of the disease: of the cases after Mules' operation, vision of $^{20}/_{30}$ or better was obtained in nine; in two the final vision was $^{20}/_{60}$ and $^{20}/_{80}$ respectively; in two the sight was nearly destroyed, and in the remainder the result is unknown. In cases after ordinary evisceration the final vision was unknown in three; in two it was normal; in one it was $^{6}/_{8}$; and in three the sight was lost. In the three cases after Frost's operation, the resulting vision was unknown in one; in one it was $^{6}/_{10}$, and in one, fingers at four feet.

In view of the uncertainty as to the comparative frequency with which enucleation and its substitutes are performed, it is useless to try to estimate, with accuracy, their comparative dangers. Considering the immense preponderance of enucleation operations, Gifford is of opinion that statistics, as well as theoretical considerations, show that enucleation as a prophylactic against sympathetic ophthalmitis is surer than any operation in which part of the eyeball, or any foreign body, is left in the orbit or scleral cavity. He also thinks that ordinary, or simple, evisceration is safer than Mules' or Frost's operation.

In the discussion which followed Gifford's paper, another example of sympathetic ophthalmitis following an operation by Frost's method was mentioned. It had been reported, but was not included in Gifford's list. J. B. L.

Gifford (Omaha). **The Treatment of Recurrent Pterygium.** *The Ophthalmic Record*, January, 1909.

This paper deals with those distressing cases mentioned by H. Knapp, fortunately rare, in which, after one or several unsuccessful operations for pterygium, there results a tense fleshy unyielding mass like a keloid scar, preventing outward movement of the eye beyond the median plane.

Knapp recommended that they should not be meddled with. Gifford's experience, however, is that all of these bad cases of recurrent pterygium can be cured by the application of a sufficiently large Thiersch graft or mucous membrane graft, after free dissection of the growth and neighbouring conjunctiva. He gives details of five cases. The lowest total number of operations performed on any one of these pterygia was four, the highest twelve. But in this last instance the high number was due to other causes than repeated relapse.

No tissue is cut away, but sufficient conjunctiva is reflected inwards towards the nose to leave the globe bare all around the inner two-fifths of the cornea, for a space from one-fourth to nearly one-half inch in width. In this dissection it is important to clean the cornea and sclera very thoroughly. The epithelial graft is pressed firmly down on to the raw surface while the lids are held open for 3–5 minutes. The edges of the graft may have to be tucked in under the loosened conjunctiva, and the latter may in some cases be drawn partly over the graft for a time with a suture. The flap is trimmed at the temporal side to leave bare the cornea and a strip of sclerotic about $^1/_{16}$ inch wide. In one case the eye was fixed in a position of abduction by a suture passed through the tendon of the external rectus and the skin of the outer canthus, to prevent displacement of the flap. Both eyes are bandaged firmly for forty-eight hours.

Epidermal grafts have the disadvantage that they ever afterwards require to be wiped carefully every day or two. If thus kept clean they look well and cause no trouble: otherwise they become unsightly from an accumulation of sodden epithelium, and set up considerable irritation. Flaps shaved off the inner surface of the lower lip may be substituted to avoid the trouble of regular wiping, but they remain of a slightly reddish colour, and so are more noticeable than well kept skin grafts. And they tend to shrink more than the latter do, and thus are not quite so suitable for very bad cases of recurrence with restricted movement. In two of Gifford's cases, the tendency to recurrence having been stopped by the use of skin flaps, these were excised later and replaced by lip flaps.

In obtaining these epithelial lip grafts the operator, with his left thumb wrapped in cotton to prevent it slipping, everts the left side of the lower lip while an assistant turns out the other side. The razor must be sharp, and the assistant should have a moist swab ready, against which the razor can be pressed in cutting the flap loose. The delicate strip of tissue is spread out carefully on the razor, and slid at once on to the globe.

Less serious recurrences—those met with after the primary operation, without impairment of motility of the eye—can be cured by the use of grafts considerably narrower than the dimensions given above. Gifford, in a large experience of primary operations for pterygium, about sixty per annum, has found McReynolds' operation (stitching the pterygium into a pocket under the conjunctiva) the least likely to be followed by recurrence. There have been only about 2 per cent. of failures. It is important in this primary operation to use a very sharp knife, in order to clear the cornea completely without sacrificing corneal tissue unnecessarily. And when, soon after the operation, a margin of fibrin can be seen extending over the corneal edge, this should be scraped off once or twice to allow the corneal epithelium to cover the defect.

H. Herbert.

Cabannes. **A New Operative Procedure for Pterygium.** *La Clinique Ophtalmologique*, 10th December, 1908.

The principle which has inspired Dr. Cabannes' method of operation is founded on three considerations. (*a*) To excise the smallest quantity of pterygium possible; (*b*) not to include the pterygium in the conjunctival suture, but to exclude it; (*c*) to re-cover the bed of the excised pterygium by the neighbouring healthy conjunctiva, without traction on that membrane. For these reasons he describes his method as a procedure by exclusion of the pterygium, with conjunctival suture by gliding. The following are the steps of the operation.

First, the head of the pterygium is detached and the pterygium dissected deeply as far as its centre. If it is small it is not excised, and if larger only the part covering the cornea is resected. The pterygium is now drawn towards the caruncle by means of forceps held by an assistant. The cornea is carefully scraped with a curette or touched with a cautery. The eye is carried outwards and the bed of the pterygium is freely exposed, whilst the latter, left to itself, retracts in a ball towards the inner angle; it will remain there and is not touched again.

The second step consists in covering the bed of the pterygium with healthy conjunctiva. The conjunctiva is detached from the corneal margin above and below as far as the vertical meridian, at which level a vertical liberating incision is made, one to one and a half cm. in extent. By dissecting up the areas thus marked out two conjunctival flaps are obtained, somewhat quadrangular in form, the one superior, the other inferior, and are easily brought without traction over the bed of the pterygium.

Thirdly, the borders of the conjunctival flaps are brought together by two connecting sutures: the one nearest the cornea ought to extend into the episcleral tissue. The stitches are left in place for six or seven days and then removed when the cicatrisation is perfect. The pterygium, retracted towards the caruncle, has withered. The eye remains red for about three weeks or a month and the cure is then complete. This operation has given Dr. Cabannes constant and lasting results.

E. M. Lithgow.

Wirtz (Mülheim). **Ionic Therapeutics in Ophthalmology.** *Klinische Monatsblätter für Augenheilkunde*, Nov.—Dec., 1908.

Ionic therapeutics (Iontophoresis, Kataphoresis) means the introduction of ions into the body by means of electrolysis for a therapeutic purpose.

As early as 1846 Klenke claimed that he cured "scrofula" by introducing iodine into the system by means of electricity. From time to time other workers have proved that substances can really be introduced into the body by this method. Animals have been quickly killed by driving solutions of alkaloids through the skin by electricity, whereas the same solutions merely applied to the skin are quite inert.

Krüchmann, within the last few years, has treated syphilitic iritis and choroiditis by Iontophoresis, using salts of mercury. In animals he was never able to detect any trace of mercury in the aqueous or vitreous, which is not surprising considering that mercuric salts are scarcely dissociated in solution. Nevertheless his patients derived great benefit from the treatment.

In contrast to Krüchmann, who attempted to treat deep-seated diseases, Wirtz has confined himself to diseases of the superficial parts, the cornea, conjunctiva, and edges of the lids. He experimented with a number of different ions on the rabbit's eye and discovered what dosage is safe for the cornea and conjunctiva respectively. He then proceeded to test their efficacy in diseases of the human eye.

The theory of Iontophoresis is shortly this. There are two kinds of electrical conductors, (1) Metals and Metalloids; (2) Solutions of salts, acids, and bases, which are called electrolytic conductors. Those of the first class are not chemically changed by the electric current, those of the second class are decomposed. In the case of salts the acid radicals appear at the positive pole and the basic radicals at the negative pole. The molecules in the rest of the solution appear to remain unchanged. Arrhenius has shown that when a salt like NaCl is dissolved in water a certain proportion of the molecules is in a state of dissociation or *ionisation* as it is called, so that along with the molecules of the undecomposed salt there are free ions of Na and Cl. These latter are exclusively the carriers of positive and negative electricity respectively. When electro-motive force acts on the solution, the ions of Cl (anions) with their negative charge, pass to the positive electrode, and the ions of Na (kations), with their positive charge, to the negative electrode, and there give up their charges, and are liberated in the free state. Hence the current does not bring about the decomposition, but utilises it to give definite direction to the particles which are already separated.

In a solution of an acid like H_2SO_4 the H has a positive charge, and the acid radicle SO_4 a negative one. Similarly in an alkaline solution like K O H the K has a positive charge, and the hydroxyl (OH) a negative one.

A substance which does not dissociate at all in solution is not an electrolyte and conducts no electricity. Further the power of an electrolyte depends on the proportion of its contained molecules which dissociate.

The human body consists of tissues impregnated with saline solution, chiefly NaCl, and is therefore an electrolyte. If the two ordinary solid metallic poles of a battery are applied to the surface, the positive pole (anode) drives the Na to the negative pole (kathode) where by combining with water caustic soda and free hydrogen are given up. Conversely the negative pole drives the Cl to the positive pole, where in presence of water hydrochloric acid and free oxygen are formed. The fluid within the body remains chemically unchanged. If, however, a solution of chloride of zinc is placed between the positive pole and the surface of the body, zinc ions enter the latter and take up their position behind the sodium ions, already advancing to the negative pole: the longer the current acts the more deeply do they penetrate.

Any other kation can be introduced in the same way. If, however, it is desired to drive in an anion like iodine, the *negative* pole must be connected with a dissolved iodine salt.

Wirtz has found by experiment that:—(1) the light metals Na, K, Li and the halogens Cl, Br, I act comparatively mildly, (2) the alkaline earths Ca, Mg and the acid radicals of sulphates and nitrates are more irritating, while (3) the hydrogen of acids and the ions of the heavy metals Zn, Cu, Hg, Fe, hydrosyl of alkalies (OH), and a few acid radicles, as of chromic and permanganic acid, are caustic.

The effect varies directly with the strength of the current and the time it is applied, and to a less extent with the strength of the solution. It must also be borne in mind that in a vascular tissue a large number of ions enter blood and lymph vessels and are carried out of the field, while in a non-vascular tissue like that of the cornea, there is naturally a more intense local action.

A large number of eye diseases are of an infective nature. The use of antiseptics as ordinarily applied has many disadvantages:—(1) Their feeble power of penetration; they do not cure trachoma. (2) It is difficult to apply them locally; anything applied to the conjunctiva must also act on the cornea; even the actual cautery to be effective in a corneal ulcer must destroy some sound tissue. (3) It is not easy to regulate the dose.

Iontophoresis has none of these disadvantages. The living tissues of mammals have a higher resisting power than most of the pathological micro-organisms. Iontophoresis in exact and careful dosage will enable us to destroy bacteria without permanent injury to the tissues.

It is very important that all drugs used should be chemically pure, and dissolved in distilled water. Solutions of $\frac{1}{2}$—2% are employed. The tears are an electrolyte, therefore the action of Cl or Na according to the pole has to be reckoned with. The ordinary action of cocain is much exaggerated when the positive pole is used, it should therefore be sparingly applied and then well washed out with distilled water before applying the current.

The electrodes devised by Wirtz are very ingenious, but it is impossible to describe them properly without a diagram. Layers of gauze impregnated with the desired solution are clamped into the necessary shape, while suitable shields protect the parts not to be treated.

Six cases of ulcer of the cornea were treated, three due to pneumococcus and three to diplobacillus. A $\frac{1}{2}$% solution of zinc sulphate was employed, with a current of 2 M.A. for from 1–2 minutes. In four cases one application sufficed. In two a second was required. The resulting scars were transparent and the average vision $^{6}/_{10}$.

The eyes in six cases of interstitial keratitis were treated with iodine ions from a 1% solution of iodide of potash or with chlorine ions from a 9% solution of sodium chloride, repeated about every 4–5 days. Radical results in such cases are not to be expected, but Wirtz considered them better than those obtained from the usual methods of treatment.

Three cases of macula corneæ were treated by chlorine ions with 2–3 M.A. for three minutes every 2–7 days. They had been treated with yellow ointment and dionine and the vision had become stationary. After iontophoresis a further considerable improvement was obtained.

In trachoma a ½% solution of copper sulphate was used with 2–3 M.A. for 2–3 minutes every few days. In four acute cases after four weeks the conjunctiva was "nearly normal," and four chronic cases were discharged cured, "as far as one can speak of cure in trachoma."

This most interesting paper cannot with justice to its author be properly condensed. All who intend to try his methods should consult the original.

P. Maxwell.

Bjerke (Linköping). **Squint: its Etiology, and its Operative Treatment under the Control of the Stereoscope.** *v. Graefe's Archiv. für Augenheilkunde*, 69, 3.

This is a long and tedious paper describing the author's experiences in his attempts to understand the causes of squint, and in his treatment of certain cases.

Six pages are devoted to the narration of his personal sensations during several years when he tried to produce voluntary squints in his own eyes. The phenomena he noted are those with which everyone is familiar who has ever "looked down his nose," or attempted to fuse stereoscopic photographs without the aid of prisms. The phenomena have been described and explained by Helmholtz and Rivers, and discussed, with other similar phenomena, in a paper read before the Ophthalmological Society of the U.K. in 1904 under the title "The judgment of the size and distance of objects."

From his observations he proceeds to propound a new theory of squint. Since he could at will produce a squint he concludes that both binocular vision and squint are the results of direct or positive innervations; *i.e.*, squint is not the result of a flaw in the central cerebral control, or of the fusion sense, but the result of a positive innervation of some sort that tends to produce squint. "Both can be learned during life, squinting after binocular vision, and, *vice versa*, binocular vision after squinting. They are to be placed in the same category as other innervation actions, such as swimming, riding, bicycling and so on."

The rest of the paper deals with the use of stereoscopes in the training of lost binocular vision, and visual acuity; he commends the use of Worth's "Amblyoscope," of coloured glasses, and Remy's "Diploscope."

In his operative treatment he complains that the ordinary tenotomies and advancements leave serious defects by causing insufficiency of the muscles, sinking of the caruncle, and displacement of the globe in the orbit. He states that the operation which he performs avoids all these defects. He exposes the internal and external recti tendons, puts a thread through each of them and through the sclero-corneal tissue (no note is made of the manner of securing these threads in the tendons), then when the patient is using the stereoscope he adjusts the tension of the threads holding each of the recti tendons. For the days after the operation the patient practices with the stereoscope, and should the effect not be all he desires he puts in more threads. He states that his threads never slip, and in the final result "no insufficiency is caused, the globe remains in its place, the caruncle does not sink down, the threads hold better because the tension is better distributed."

N. Bishop Harman.

A. Beauvois. **On the Treatment of Septic Keratitis following on the Accidents of Industry..** *Recueil d'Ophtalmologie*, Sep., 1908.

Statistics go to prove that the vast majority of the injuries of the eye are corneal. The author sees large numbers of cases of corneal injury in the course of his practice, many of which from neglect become infected and cause a septic keratitis with or without hypopyon. The use of dirty domestic articles for the removal of foreign bodies, the unskilled arts of the chemist, the use of filthy water—such as urine—for eye washes, and lastly the ineffectual application of properly prescribed medication, account for the conversion of simple injuries into serious keratitis.

He commends the instruction of Valude that in every workshop where accidents to the eyes are frequent there should be hung up notices to the effect that:—"Injuries to the eyes, however small, or scratches from foreign bodies, should not be exposed to the air, but the eye should be bandaged at once, and be kept covered for two days." He thinks this notice would accustom the workpeople to think more seriously of eye injuries, and induce them to apply for treatment in good time.

But even when proper medication of the eye is prescribed by the surgeon he finds the effect is frequently lost by failure of proper application. He feels this can only be got over by the personal treatment of the surgeon; and he makes a vigorous plea for the establishment of "Hospitals for Accidents" where these cases would receive satisfactory attention. He recommends the suggestion to the Insurance Companies, in the belief that the saving to them by the prevention of these disasters would more than recompense them for their outlay on the hospitals.

There is no doubt that ointments and drops intended for application to the eye should, at any rate in the first instance, be applied by the surgeon, or by an efficient deputy; and in this country the casualty departments of our hospitals fill the demand for "hospitals for accidents"; but so far we have not heard that the numerous and wealthy insurance companies have recognised their value by contributing to the expenses of their upkeep.

The fire insurance companies contribute to the fire brigades, why should not the accident companies to the hospitals?

N. Bishop Harman.

W. T. Shoemaker (Philadelphia, U.S.A.). **Retinitis Pigmentosa.** Philadelphia: J. B. Lippincott Co., 1909.

Dr. Shoemaker offers an interesting and fairly complete sketch of the strange disease known as retinitis pigmentosa: with this essay he won the Alvarenga prize some years ago. A feature of the book is that he describes in it seventeen cases which he discovered among the pupils of a deaf and dumb institution, and another is the careful investigation of the blood and urine of three patients which was carried out in a most painstaking manner by Dr. Swan, but which proved entirely barren of result. It is not pretended that there is anything very new in the book,—rather it consists of a series of analyses of the results attained by various writers and the theories held by them, with comments by the author. We note that he considers ring scotoma a rarity and seems almost to doubt its existence, partly because it does not fit in conveniently with his theory of causation; in this observation he is not in agreement with some other authors, and perhaps the author may not have employed a sufficiently minute test object. He is also very despondent—and rightly so—on the subject of successful treatment. The book forms chiefly a resumé of our knowledge on the subject and may be confidently recommended.

W. G. S.

René Onfray (Paris). **Manuel Pratique du Strabisme.** Paris: G. Steinheil, 1909.

A preface to this excellent brochure has been provided by A. Rochon-Duvigneaud. The subjects of normal binocular vision, convergent strabismus, divergent strabismus and vertical strabismus are successively dealt with in the volume. Prominence is given to the employment of Remy's diploscope and its modifications, also to the amblyoscope; these instruments are described and the indications for their use are pointed out. The operative treatment of squint and the question of choice of operation are discussed. The book is illustrated, is essentially practical and will be read with interest by the physician as well as the ophthalmologist.

PRIMARY GLAUCOMA IN YOUNG PATIENTS.

By A. Hugh Thompson, M.D. Cantab.
Surgeon to Western Ophthalmic Hospital, London.

The following notes are offered in the hope that they will elicit the records of other similar cases, which the editors of the "Ophthalmic Review" invite their readers to supply.

It is unusual to see patients suffering from primary glaucoma under the age of forty. Moreover, so far as I am aware, no current theory of the causation of the disease, neither Priestley Smith's, an essential factor in which is the gradual increase of the lens in volume as age advances, nor the recent theory of Thomson Henderson, which makes it dependent on a senile sclerosis of the fibres surrounding Schlemm's canal,—attempts to explain its occurrence in patients not yet middle aged. For these reasons it seems to me worth while to put on record cases that one has seen in comparatively young people of typical primary glaucoma, excluding cases of buphthalmos and also cases secondary to iritis, cyclitis etc., or any cases with "K.P."

Case I. C.C., æt. 33, labourer.

August 2, 1902. Came to hospital on account of gradual failure of sight of left eye for two months. Left V. hand movements, T.+1. Circumcorneal injection. Field very contracted. Disc deeply cupped. *Anterior chamber deep.* Right V. $^{6}/_{0}$, T.n. Disc normal.

Under eserin the glaucomatous symptoms in the left eye temporarily improved, but in February, 1903, there was a subacute attack with steamy cornea and T.+2.

February 18, 1903. Left iridectomy, followed by bulging scar. No attendance between May 9, 1903, and January 5, 1906.

January 5, 1906. Patient returned to hospital on account of attacks of dimness and rainbow colours in right eye. Left is totally blind. Right V. $^{6}/_{9}$ but field confined to immediate vicinity of fixation point and the upper and outer sector, the remaining three-fourths of the field beyond 5° from fixation point being blind. T.+1 or more, yielding to eserin. *Anterior chamber deep.* Optic disc not cupped. No pain.

January 27, 1906. Iridectomy right, leaving cystoid cicatrix.

February 6, 1906. V.−2·5 cyl. axis vertical $^{6}/_{9}$

Eight months later the tension began to rise again. The anterior chamber remained deep but a deep cupping of the disc developed during period of observation.

November 28, 1906. Right sclerotomy.

February 6, 1907. V.−7·0 cyl. axis\80° $^{6}/_{9}$ Ji.

January, 1908. Still sees $^{6}/_{9}$ T. full; uses Gutt. Eserin gr. 1 ad. ℥ 1 and adrenalin 1 : 4000 regularly.

March, 1909. Has had occasional attacks of coloured lights. T.n. to full n. V. with correction $^{6}/_{12}$ 3l. The field remains practically unchanged since the first operation.

CASE II. E.A., æt. 32, checker on Great Central Railway.

June 6, 1903. Sight of right eye failed for 2 or 3 days without any marked congestion or pain. T.+2. Pupil dilated to 8 mm. Anterior chamber not shallow. Cornea steamy. No K.P. Fundus details not visible. Eyes have never been bad before, but used to wear glasses, prescribed in Birmingham Hospital. Has used no drug. The left eye was normal as to tension and size of pupil. Vision of left $^6/_{18}$, $+4\cdot0$ D. $^6/_{12}$ Il.

June 11, 1903. After eserin, leeching and calomel, the tension of the right globe was reduced to $+1$. The cornea was clear and the disc could be seen, with arterial pulsation.

June 12, 1903. Right iridectomy.

June 19, 1903. Field of right contracted on nasal side to within 10° of fixation point $V\frac{+1\cdot5\text{ sph}}{+3\cdot0\text{ cyl. axis horizontal}} = {}^6/_{36}$.

June 21, 1903. Left field full. T.n. $\underset{+6}{\boldsymbol{+}}{}^{+5}$ V. $+5$ $^6/_9$.

Seven months later the patient returned with an attack of subacute glaucoma in the left eye.

January 23, 1904. Left T. $+1$. Hazy cornea. Eserin reduces tension to full n.

February 17, 1904. Left iridectomy.

May 21, 1904. Right disc white. Slight cupping. Field as in June, 1903. $V\frac{+3\cdot0}{+2\cdot5\text{ cyl. horiz.}}\ {}^6/_{18}$. Left disc good colour; no cupping. $V\frac{+3\cdot0}{+3\cdot5\text{ cyl. }\diagdown 20}\ {}^6/_9$.

Four and a half years later, *i.e.*, five and a half years from the first operation, the patient reappeared, not with any fresh attack of glaucoma, but only because he had broken his glasses.

November 14, 1908. Tn. in both. Right disc as in 1904. $V\frac{+2\cdot5}{+3\cdot0\text{ cyl.}-}\ {}^6/_{18}$. Field exactly the same as in 1903. Left disc good colour, very deep cupping. Field full. $V.\frac{+3\cdot0}{+3\cdot5\text{ cyl.}\diagdown 20}\ {}^6/_9$.

This patient had had no symptoms for 4½ years. The fields had remained absolutely without change. The only fresh appearance was the development of cupping in the left disc.

CASE III. A.B., æt. 25, domestic servant.

This was a patient whom I shewed to the Ophthalmological Society in June, 1906.* She had well marked capsulo-pupillary membranes in both eyes together with a deeply cupped white disc in the left eye. The vision of that eye was down to counting fingers, and the whole upper part of the field was blind. There was no increased tension and no pain, but according to the patient's account the sight of the eye had become misty suddenly, five days before she first came to consult me at the hospital. In spite of this history I was at first inclined, on account of the association with pupillary membranes, and the atypical field, to regard the cupping as congenital. Subsequently, however, an increase of tension, which persisted in spite of eserin, convinced me that it was glaucomatous. The right eye had a full field and normal tension. Vision (which was interfered with by the capsulo-pupillary membrane) $-1{\cdot}0\ {}^{6}/_{12}$.

I proposed to do an iridectomy on this patient's left eye, but she had to leave London and I lost sight of her.

CASE IV. The youngest patient with well marked primary glaucoma that I remember to have seen was a boy of 15, a patient of Mr. Lang's at Moorfields in the year 1898. The boy had not had any pain, nor had he seen any coloured lights, but the dimness of vision had been noticed for six months. Both optic discs were pale and deeply cupped, and on both there was arterial pulsation. Both fields were much contracted, and the vision of the right eye was reduced to $^{6}/_{36}$ ll, and that of the left to counting fingers. Iridectomy was performed by Mr. Lang on both eyes. The anterior chambers were not shallow. I cannot trace the subsequent history of this case.

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* *Oph. Review* for 1906, p. 249.

Case V. The following case of prolonged high tension occurring in a girl of about the same age is worth noting.

September, 1901. E.S., æt. 11, came for refraction. R. $\underset{+2}{+}^{+6}$ L. $\underset{+2\,5}{+}\overset{+6}{\cdot}$. Glasses ordered.

October, 1905. Æt. 15. Glasses re-ordered. V. right $^{6}/_{12}$, left $^{6}/_{24}$.

November, 1906. Æt. 16. Came complaining of seeing coloured lights. Glasses re-tested and found to be correct. T. + 1 in both eyes. No cupping of either disc. Fields full. Corneæ not small (12 mm. in diameter).

Eserin drops brought down tension to normal. At first they were used of the strength gr. 1 to the ounce. If they were discontinued the tension went up again, but I was able gradually to diminish the strength to gr. $\frac{1}{8}$ to the ounce, until in May, 1907, tension remained normal without eserin.

A few weeks ago (April 21, 1909) this patient came to the hospital in reply to a postcard and was seen in my absence by my colleague, Mr. Holthouse, who reports that there is no return of glaucomatous symptoms in either eye.

These cases are obviously too few from which to make any generalisation with regard to glaucoma occurring in young subjects, but they are numerous enough to show that it is a combination not so rare as some are apt to suppose. The following features in my cases are worth noting :—

1. In not one of the cases were the anterior chambers noted as being shallow, and in one of them they were unusually deep. Speaking from memory, I should say that in no case were the corneæ small, but I can only confirm this impression by the record of a measurement in one case (Case V.).

2. The glaucoma generally ran a chronic course, with or without subacute exacerbations, but without much pain.

3. In the four first cases, cupping of the disc, commencing when the disease was already far advanced, was a well-marked feature. In the fifth, where an incipient glaucoma appears to have been arrested, there was no cupping.

4. In the two first cases—the only ones which I have been able to follow up for any length of time—the effect of operative treatment in arresting the progress of the disease was, on the whole, good.

P.S.—In the April number of "The Ophthalmoscope" Devereux Marshall reports a case of glaucoma with features very similar to mine. The case was that of a young man of 21 with deep cupping of the discs and deep anterior chambers, but with one feature different from any in my cases, viz.: retinal hæmorrhages.

SIMEON SNELL, F.R.C.S. (Edin.), D.Sc. (Sheffield).

OBITUARY.

SIMEON SNELL, F.R.C.S. (Edin.), D.Sc. (Sheffield).

The death of Mr. Simeon Snell, which occurred on April 17th, will be greatly deplored by the Medical profession, and especially by Ophthalmologists. He was born near Launceston, fifty-seven years ago, his father being a doctor in that district. After receiving his early education at Mannamead College, Plymouth, he entered upon his medical studies at Leeds, afterwards working at Guy's Hospital and Moorfields. In 1872 he became M.R.C.S., and in the following year L.R.C.P., subsequently, in 1892, obtaining his F.R.C.S., Edinburgh.

Sheffield was the city in which he elected to settle, and he practised in that city from 1874 up to the time of his death. He was Ophthalmic Surgeon to the Sheffield Royal Infirmary during nearly the whole of this period. The key-note of his life, and no doubt an important factor in his successful career, was his ceaseless energy, which extended beyond the mere bounds of his speciality, and led him to exert himself in endeavouring to obtain the charter for the Sheffield University. His efforts being crowned with success, he was appointed Professor of Ophthalmology and a member of the Council of the University. In addition, he was Ophthalmic Surgeon to the Sheffield School for the Blind, and Consulting Ophthalmic Surgeon to the Mexborough Hospital.

His interest in the essentially practical aspects of Ophthalmology may be plainly observed in the investigations which he undertook into certain industrial diseases, and the Sheffield Infirmary formed a fertile ground for such enquiries. Snell's work on Miners' Nystagmus is so well known that it is unnecessary to give further details, and the book which he published on this subject has become a standard work of reference.

He also interested himself in the effect of occupation on the eyes of burnishers, steel smelters, electric welders, bottle makers, etc., and the results of his observations were turned to practical use in the means he devised for eliminating risks in these trades. He was among the earliest in this country to employ the electro-magnet for removing magnetisable foreign bodies from the eye: the small magnet which he designed has been used very widely by Ophthalmic Surgeons and has proved of inestimable value.

In 1895 he published an excellent little book written on popular lines entitled "Eyesight and School Life," which contains many valuable suggestions.

His interest in his work and his care in recording cases is well shown by a glance at the Transactions of the Ophthalmological Society of the United Kingdom: the earliest number (1881) contains articles by Snell, and the last (1909) also has a contribution under his name; indeed it is rare to find a volume of the Transactions, between these dates, in which his name does not appear.

A man who consistently and constantly endeavoured to increase the knowledge of Ophthalmic Surgery necessarily came to the front of his profession, and in due course Snell reaped his reward. He was elected Vice-president, and later President, of the Ophthalmological section of the British Medical Association, President of the Yorkshire Branch of the British Medical Association, President of the Sheffield Medico-Chirurgical Society, and finally had the great honour last year of becoming President of the British Medical Association, a position never before held by an Ophthalmic Surgeon. The Middlemore prize was awarded him at that time.

Snell did not confine his energies to his special subject, but engaged with characteristic vigour in literary pursuits. He founded, and for many years was Editor-in-chief of, the *Sheffield Medical Journal* (afterwards enlarged and called the *Quarterly Medical Journal*): he took a leading part in the management of the Sheffield Literary and Philosophical Society, one of the most important organisations in the city, becoming Secretary of the Society in 1887.

The city of Sheffield recognised his ability and his services to the community by creating him Justice of the Peace in 1897.

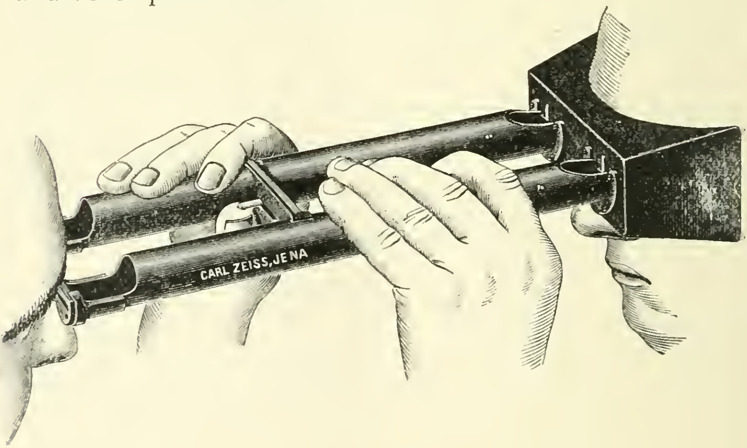
In conclusion, the deep impression he made on the city of his adoption may be gauged by the Bishop of Sheffield's eulogy in his Sermon at St. Mark's on the occasion of Snell's untimely death. The Bishop referred to him as "One of the makers of modern Sheffield," and said, "Yet it is not for his honours that he should be remembered, but for the services that he has rendered mankind in general, especially in regard to his researches on the subject of the eye."

NEW INTER-PUPILLARY DISTANCE GAUGE.

Manufactured by Carl Zeiss, 29 Margaret Street,
Regent Street, London.

We have read a description of this instrument made by Messrs. Zeiss on the suggestion of Professor Hertel of Jena. It seems admirably to fulfil the purpose for which it is intended, and cannot fail to be of great service in the fitting of spectacles. So far as we have information, the instrument can only be of use in orthophoria and will not afford any, or at any rate much, information where decentration is required. For that we must still fall back on the classical tables of Percival. Notwithstanding this limitation, however, we think the instrument a most valuable adjunct to the armamentarium alike of the Ophthalmic Surgeon and of the Spectacle vendor.

Probably also the invention will be of considerable service to those who are interested in anthropometric and developmental measurements.



REVIEWS.

A. Del Monte (Naples). **Conjunctivitis Petrificans.** *Archivio di Ottalmologia* xvi, 2, 3, 4, 5, 1908.

It is to Leber that we owe the first description of this disease, a malady so rare that as yet there are only three or four recorded cases of it, and even these few are not precisely similar in all respects. In the case which Del Monte proceeds in a long paper (84 pages) to relate, he was able, he believes, to arrive with fair certainty at the conclusion that the lesion was due to the bacillus xerosis: this fact, apart from the intrinsic interest of so rare a case, has induced him to publish a very full account of it.

The patient was a young woman of 25, a native of Naples, in perfect health so far as a very thorough examination could discover: she had no family history pointing to any morbid condition. Her first appearance at the Naples clinique was on account of redness and swelling of the left upper eyelid: this had been present for two days: on the lid appeared a number of yellowish vesicles about the size of a pin head: these broke down very soon, leaving a largish red-brown stain. About a week later there was some lachrymation, redness, and discharge; it was at this stage that the patient first presented herself. The skin of the left upper lid exhibited a number of small whitish cicatrices, as well as reddish-brown stains, each encircled by a zone of hyperæmia. The conjunctiva of lid and of fornix was decidedly hyperæmic, and on the globe it showed an irregular reddish-yellow patch the size of a large pea, not raised above the surrounding level; through this the sclera could be seen to be slightly injected, and it was surrounded by a zone of marked redness; at other parts the bulbar membrane appeared quite normal in aspect. The pain was slight; there was a little lachrymation. In a few days the skin of the lids showed no more necrotic patches, only the cicatrices where these had been, but the conjunctiva of tarsus and fornices, especially the lower, was very red; in the middle portion of the lower palpebral surface was a superficial ulcer or erosion about half a centimetre wide, with a hæmorrhage in the floor of it. For the next few days this ulcer acquired a yellowish-white colour, such as one sees in a diphtheritic patch, but there was very little local reaction indeed and the lymphatic glands were not enlarged. A few days later another attack of lachrymation and slight redness came on; in that portion of the conjunctiva of the globe opposed to the ulcer were found numerous minute hæmorrhages; these disappeared, and again a superficial ulcer occurred with a yellowish border surrounded by injection. This gave place very quickly to a scar of a dirty white colour, not very well defined at its margins. This reached to a very short distance from the corneal margin and was separated from the area of the palpebral ulcer by a zone of considerable hyperæmia. Bacteriological examination revealed the presence of very numerous bacilli resembling the diphtheritic; on this account treatment with Behring's serum was at once begun and this produced an almost immediate improvement in the local condition; intermission of this treatment after a week was followed by a relapse. Frèsh punctiform hæmorrhages appeared in the conjunctiva as well as a small whitish patch like those seen in xerosis which persisted even after the resumption of the serum treatment; a slight degree of cicatrisation was now manifest in the inferior fornix. A further recurrence, with swelling of the lid and œdema of the conjunctiva, took place in about another ten days; there was a certain amount of secretion and a fresh development of the eroded patches of conjunctiva, whitish and thickened, with petechial hæmorrhages, in aspect all much as in the previous attack. It is needless to follow all the ups and downs of the case which the author narrates at great length; sufficient to say that there were numerous recurrences or recrudescences, all ushered in by œdema, then small hæmorrhages, whitish eroded plaques, and cicatrisation with increasing destruction of the lower cul-de-sac, trichiasis, and an increased degree of symblepharon. Wearied at last with these repeated attacks, each one leaving the eye a little more damaged than the predecessor, and disappointed with the result of serum treatment, under which improvement always occurred but only to be succeeded in a few days more or less by a fresh invasion, Del Monte boldly excised the whole affected area, taking steps at the same time to remedy the symblepharon and filling up the gap by borrowing from the neighbouring normal tissues. Unfortunately, close by the side of the wound, fresh petechiæ and the familiar superficial dirty ulcers formed, but these recovered on being touched with the electro-cautery; for some little time this process of breaking down and recovery went on, but gradually a more healthy condition became firmly established.

The next symptom was a feeling of weight and heaviness in the upper lid, with a certain amount of ptosis at times; this recovered when treated electrically. Then at the inner portion of the corneo-scleral margin there gradually developed an appearance of whitish cicatricial-looking tissue, very closely resembling an incipient pterygium, and again, more than two years from the onset of the disease, there was a recurrence of the hæmorrhages, the secretion, and the excoriation.

All this time, however, and it is a singular fact, the same area of conjunctiva was affected, the middle portion, namely, of the tarsal conjunctiva, and the corresponding lower, and lower-inner, portion of the globe. Other points of note in the history of the case were the very varying intensity of the recurrences, and the inequality in length of the periods of time (10 to 27 days); the longest period occurred when the patient was undergoing treatment with antidiphtheritic serum. There could be little doubt of the value of the treatment in reducing the violence of the attacks and mitigating the evil results, even if it was powerless to check the disease altogether, and although the patient had injections nearly every day for a month, and that of a very considerable dose, there was no sign of damage caused thereby either local or general.

Del Monte gathers up the description of the case in this fashion, after having thus, at extreme length, detailed the particulars: In an eye, hitherto sound, hyperæmia of the tarsal conjunctiva and of the fornices suddenly came on and remained there about four days, accompanied by very copious secretion. Then on the middle portion of the tarsal conjunctiva below, and in the lower and lower inner sectors of the conjunctiva of the globe, there occurred hæmorrhages, sometimes relatively large and single, at other times minute and multiple, these being accompanied by sharp pain and profuse lachrymation. The epithelium over those hæmorrhages was shed as grayish-white detritus, the aspect of the parts resembling that of a burn of the membrane, the margins clean cut, but the floor irregular, presently covered by a whitish or yellowish membrane not easily removed even with scraping. The whole aspect of the exudate, tough, membranous, smooth, not elevated, and surrounded by a considerable zone of hyperæmia, as well as of the resulting scars, suggested strongly the appearance of a diphtheritic ulcer. Other little foci appeared also, without being preceded by hæmorrhages, similar in appearance, always small in size, whitish in colour. The healing of these superficial ulcerations and then the return of pain, hæmorrhages, and formation of fresh lesions went on for a long time, as above narrated. Apart from injection of serum no treatment seemed to produce any effect whatever.

The report of the examination of two morsels removed at an early stage in the morbid process now occupies Del Monte's attention. The portions were hardened, cut in series and stained with hæmatoxylin, eosin or carmine. It became plain from the examination of these that the morbid process divided itself into two different stages. The part removed at a very early stage in the disease showed loss of epithelium, though the surface was for the most part smooth; there were few lamellæ on the surface parallel to it, those present being homogeneous or finely granular. In the interstices of this tissue were numerous round or elongated cells, especially near the surface. In the substance the lymph spaces were very large, so much so that at parts the tissue was almost reduced to a mere large-meshed network. The vessels contained in this tissue were much dilated and showed here and there œdema of the endothelium, and indeed of all the coats. In the vessels were to be seen some leucocytes many times larger than the red corpuscles, having one or more nuclei. In the part removed at a later stage there were signs of a copious serous and cellular exudation which had taken place in the interior of a fibrous tissue.

The affected portions may be considered to consist of three layers, the first an irregular open network of wide meshes, formed of altered connective tissue, in the openings of which lie granular particles and pale red blood corpuscles, and over it the epithelium has been completely shed, but may be seen also beginning to form again and spread in. Immediately below this layer comes one densely infiltrated with small round cells, some with one, some with many nuclei. The connective tissue fibres here seem for the most part vertical to the surface (herein differing from those in the superficial layer) and the network has a closer mesh. The endothelium of the scanty vessels is swollen and in places detached. The deepest of the three layers is composed of young fibrous tissue, the bundles meeting and crossing at all angles and in all directions, and between these lie many large leucocytes. This brief description is amplified in the original publication by a long and particular account of a great series of sections, most carefully examined and accurately described as to actual appearance and chemical reactions, the written account being enriched by the addition of a number of beautiful reproductions in colour.

Del Monte's impression of the course of events, as constructed by him out of the varied aspect of the sections examined with great care and in large numbers, is that an œdema and cellular infiltration was the first step in the morbid pracess, this occurring in the more superficial layers particularly. Following upon this, by the absorption of the fluid and in consequence of the pressure undergone, which would of course be accentuated by the existence of a highly resisting fibres, calcification might easily take place with the partial necrosis of tissue.

Micro-organisms were obtained in small quantities from the general surface of the ulcers, and from the vacuoles in the sub-epithelial tissue and in the broken down tissue, but in larger numbers in the surrounding zone of cellular infiltration. The diphtheritic form was most frequent, some being straight, some gently curved, with a clear central space, isolated or in small groups: less frequent were cocci solitary or in pairs; more rare short chains of 3 to 5, or bunches of 7 or 8; here and there bacillary forms in groups showing all gradations from the true diphtherial bacilli to that of cocci. There were also small bundles of ramified filaments breaking up in fragments similar to certain bacilli. Occasionally under the epithelium at the edge of the ulcers would be found large cells containing numerous bacilli, such as are seen in xerosis; these were more frequent in the second layer of the tissue of one of the patches as described above.

Now, the xerosis bacillus is a very frequent inhabitant of the conjunctival sac both in health and disease, but always remains, says Del Monte, exterior to the epithelium. It is not described as penetrating into the tissues—yet here we find it in the tissues themselves, sometimes even in leucocytes, and in great numbers in the epithelial cells. Two forms of organism were frequently present, one bacillary, the other coccal, but not, the author was satisfied from its culture and reactions, staphylococcal; he was unable to identify it with any measure of certainty. Of the identity of the former with the xerosis bacillus, which was constantly present in the conjunctival sac of the patient, he entertained no doubt whatever.

The author then conducted certain experiments with the organism isolated, introducing a culture into a "pocket" in the cornea of the rabbit and observing with care the reaction produced. There was set up ulceration involving the epithelium of the cornea alone, the margins being infiltrated in all directions except along the track of the knife; further, there was slight œdema and cellular (mono- and poly-nuclear) infiltration in the corneal substance over a somewhat smaller area; not unnaturally there was not evident any tendency to recurrence; it is hardly to be expected that all the characters should be reproduced, but those which were tended to encourage the author in his view of the causation.

Del Monte arranges his chief conclusions on the case under six headings, thus:—

(1) The morbid process in the original patient was certainly parasitic in origin, as is shown by its transmission by contact and by the favourable influence of the serum.

(2) In the affected tissues there was found in moderate numbers a bacillus agreeing in its characters with the bacillus xerosis.

(3) This organism, an almost constant inhabitant of the normal conjunctival sac, is in other conditions never found to have penetrated the epithelium, but always is situated superficially.

(4) On examination of the material removed by scraping from the ulcerated region (with due precautions against error) an organism was constantly found which was identified with all accuracy possible with the bacillus xerosis.

(5) When introduced into the cornea of a rabbit in pure culture the organism thus isolated, which was evidently not merely a casual visitant but was in a condition of exceptional activity, produced a lesion of serious moment.

(6) The lesion of the cornea thus induced was not similar at all to such as are produced by other organisms under similar experimental conditions, but agreed in its main features on the other hand with that which existed in the original patient.

Taking it for granted for the meantime that the disease is due to the xerosis bacillus one is faced with the great difficulty of accounting in any way for the extreme rarity of the disease in view of the well nigh constant presence of that organism in the conjunctiva; obviously more than its mere penetration into the tissue is required to explain its pathogenic activity. The success attending the use of Behring's serum in this case is curious also; unless it were merely by virtue of polyvalence, can it be explained on the basis of the morphological and other affinities between the xerosis bacillus and the Klebs-Loeffler? The alternating periods of quiescence and activity form a singular clinical feature, the explanation of which is likewise attended with difficulty. The author inclines to Leber's suggestion in regard to a similar case that the xerosis bacillus is a variety of streptothrix which has its own life cycle to pass through, and therefore may well have periods of inactivity and of virulence.

In the "Ophthalmic Review" for January, 1896 (xv, 9), and for March, 1901 (xx, 67), will be found reviews of papers by Leber (Report of Heidelberg Congress, 1895, and *v. Graefe's Archiv.*, 1900) on this very rare and curious form of degeneration of the conjunctiva, with accounts of three or four cases. Examples have also been published by Reif, by Mayweg, and by Posey. This review is already so long that it will be sufficient to draw attention to these other papers. A notable feature of Leber's cases (I have not at present access to the others) is that exactly the same portion of conjunctiva, namely that of the lower inner portion, was chiefly affected, just as in Del Monte's case, and that symblepharon resulted. The description too of the white patches and of the recurring fresh attacks reads very similarly: in Leber's cases the xerosis bacillus does not seem to have been suspected as the cause.

The first case of which any record is preserved was noticed in the year 1669; the patient was believed to have been bewitched! W. G. S.

PADERSTEIN (Berlin). **The Pathology of Nodular Degeneration of the Cornea.** *Klinische Monatsblätter für Augenheilkunde*, Feb., 1909.

AFTER describing the pathological changes found by Groenouw, Chevallereau, Fuchs, Werhli, Dimmer, and Sattler, all of whose investigations have been limited to small pieces of the cornea, either scraped off the surface or trephined, Paderstein goes on to mention a case where he had the opportunity of examining the whole eye, which was removed after death.

The patient, a blacksmith, aged 41, came under Paderstein's observation on account of an injury to the right brow which led to periostitis, and ultimately to suppurative meningitis; but this appears to have had no relation to the condition of the cornea, as the nodular opacities had been noted by Dr. H. Lehmann two years before, when the patient consulted him with respect to glasses for near work. There was no history of any other members of the family being similarly affected, and syphilis, rheumatism and tubercle could be excluded.

The paper is illustrated with six plates of section cuttings, which are minutely described. On first view one gets the impression that the disease primarily affected Bowman's membrane; closer inspection, however, shows that the primary seat is in the basal cells of the epithelium. These changes cannot be considered as secondary, due to pressure by the "knobs," as changes are found in the nuclei far from the embedded substance.

Paderstein considers that a degeneration of the epithelial cells, of which so far nothing is known, takes place, in the progress of which the nuclei are destroyed and the protoplasm changed to a hyaloid substance, the real nature of which is not definable, although it is to be distinguished from the known products of degeneration (amyloid, etc.), as it does not give their reactions. This degenerative process is not confined to the basal cells, but affects the adjoining layers also; by fusion of the degenerated cells knots and little heaps are formed.

He explains the presence of cells and remains of cells found in the spaces between the layers of the stratification as being due to the partially degenerated cells being separated from those cells which have become completely degenerated; the hyaloid substance is more inclined to adhere to Bowman's membrane, and to the normal epithelium, whilst those cells in the process of change seem to be agglutinated with the substance. Besides these processes of degeneration, which are of chief importance, processes of secretion may have an influence, the presence of a kind of membrane on the basal cells indicating this. Though inflammatory symptoms are not altogether absent (*i.e.*, the existence of small vessels on the surface, beneath the epithelium on the upper limbus, and sporadic infiltration on the back of Bowman's membrane), they are too insignificant to claim notice.

Paderstein compares his own observations with those of other authorities. Thus, hyaloid deposits were found by Groenouw, Fuchs, Sattler, and Dimmer, but Groenouw and Fuchs found them in the parenchyma of the cornea. Fuchs found Bowman's membrane missing, and he considered the slight change in the epithelium of the cornea as secondary. Sattler found the hyaloid deposit in the upper layers of the lamellæ, Bowman's membrane being for the greater part missing. Wehrli differs from them all, as he considers the condition to be of a tubercular nature.

Paderstein quotes a similar case reported by Elschnig, where the whole cornea was examined, and which he describes as a case of "druse-formation" on Bowman's membrane, but he did not find degeneration of the base cells, and he therefore calls the nodules "liberation products of the epithelium." His case differs from Paderstein's in the evenness of the surface of the cornea, and in the appearance of the opacities, which were iridescent.

Elschnig contends that the formation of "drusen" on Bowman's membrane differs from that of other hyaloid membranes, as with the latter it is at the outset epithelial, whilst Bowman's membrane owes its existence to a process of concentration of the frontal lamellæ of the cornea, and is therefore of a mesodermal origin. The differences observed by the various authorities may be explained as due to different phases of the same process.

Paderstein's observations seem to support Fleischer's theory, that in all these cases of nodular opacity of the cornea, a deposit of "foreign substance" has occurred.

HERBERT H. FOLKER.

MORAX and DUVERGER. **On the Nature and Symptomatology of certain remote complications of penetrating wounds of the Cornea. Epithelial invasion of the walls of the Anterior Chamber.** *Annales d'Oculistique*, Jan., 1909.

THE complications of traumatic or operative penetrating wounds of the cornea, or of the eyeball in general, fall into two classes: those due to immediate or late infection, and those independent of septic processes. The present article deals with a complication of the second group; its essential characteristic is penetration of the corneal epithelium into the anterior chamber. Hitherto the diagnosis of this condition has been made only by anatomical examination; the authors draw attention to the clinical aspect of the above-mentioned complication of penetrating wounds.

They publish full and careful notes of two cases, with a detailed and illustrated report of the pathological examination of the eyeballs These notes should be read in the original; the following are the headings:

Case I. Accidental wound of cornea: recovery: irritative symptoms a year later, without apparent structural change: later, development of epithelial cysts of iris: spontaneous luxation of lens: increase of tension: enucleation: epithelial invagination.

Case II. Operative wound of cornea followed several years later by the development of a præ-corneal cyst: epithelial invasion of the anterior chamber: pouch-like prolongation of the epithelial cyst beneath the conjunctiva.

Epithelial penetration of the eye is seen only after perforating wounds: one case has been quoted by Meller, in which this complication followed a perforating ulcer of the cornea, but an iridectomy had subsequently been performed. It occurs most frequently after accidental wounds, usually by sharp-pointed implements, such as scissors, forks, etc., and this class of case is almost always in children under the age of 10. Instances in which the condition follows operation wounds, are usually met with in patients operated upon for cataract.

Published cases indicate that a peripheral position of the corneal wound, irregularity of its edges, delay in healing by inclusion of iris tissue or lens capsule, are conditions favourable to the occurrence of epithelial invasion. When healing is complete a prolonged period of quiet ensues, in which the eye is free from any sign of irritation: this period has varied from 10 months (in one of the author's cases) to ten years (in a case of Stoelting's). After this period of quiescence, the first indications of the complication become manifest: these may be anatomical alterations of the anterior chamber, the development of cysts of the iris, or symptoms of ocular irritation. In the author's first case, these symptoms included intense photophobia, lacrimation and blepharospasm, peri-ocular pain. Whatever may be the explanation of these symptoms, the writers think it important to point out that they may be present at a stage in which there are no recognisable signs of the formation of an epithelial cyst. The second phase of the affection is characterised by the appearance of a cyst, or cysts, in the anterior chamber; and the third stage is usually one of hypertony.

The prophylaxis of this complication of penetrating wounds is to be found in the perfect coaptation of the lips of the wound, and the absence of any inclusions of iris or capsule, conditions which are often difficult of achievement especially in accidental wounds. Treatment consists in the removal of the eyeball, or of its anterior segment. Ablation of the cysts, which has been accomplished, gives only a temporary result. There is, however, no evidence to show that epithelial invasion ever extends posterior to the barrier offered by the zonule and lens capsule, and hence retention of the posterior segment of the globe is, so far as recurrence of cysts is concerned, unobjectionable.

J. B. L.

EMIL JUSELIUS (Wyborg, Finland). **Spontaneous Cysts of the Iris, their Pathogenesis and Development.** *Klinische Monatsblätter für Augenheilkunde*, Sept., 1908.

AFTER summarising the theories which have been advanced by different authors to account for iris cysts of spontaneous, nontraumatic origin, the author gives the main facts of a case which has come under his own observation. The patient, a boy of six years, presented in the right eye a greyish tumour, translucent on focal illumination, lying upon the anterior surface of the temporal part of the iris. It was believed to be of spontaneous occurrence. The author excised the cyst along with the attached segment of iris, and cut it in serial sections perpendicular to the posterior surface of the iris.

Three structures were found: (1) The cyst, as clinically observed, developed in the anterior part of the iris stroma and lined with unpigmented stratified squamous epithelium. (2) Enclosed in the latter a small cyst formed of pigmented cells derived from, and attached by a hilum to, the pigmented epithelium on the posterior surface of the iris. (3) Rounded groups of cells lying between the pigment layer and the iris stroma, unpigmented and resembling the basal cells of the wall of the main cyst. The author refers the reader to a previous paper in which he traced the development of the musculature of the iris from the anterior layer of the posterior iris epithelium, and expresses the opinion that the cell groups found between the epithelium and the stroma in the present case are derivatives of ectodermal cells which have failed to develop normally into the muscular tissue and which he believes may develop further into cysts of larger dimensions like the one which is the subject of his paper.

A. J. Ballantyne

THORNER (Berlin). **Researches on the Origin of Choked Disc.** *v. Graefe's Archiv für Ophthalmologie*, 69, 3.

EVERY young German writer on the subject of optic neuritis seems to start with the assumption that his readers will be entirely ignorant of what has been written previously on the subject.

Dr. Thorner is, in this respect, no exception. A considerable proportion of his paper of 60 pages is devoted to a resumé of previous work.

Nine pages are devoted to an exposition of very elementary hydrostatics and fourteen pages only to the description of the author's own somewhat crude experiments on the production of choked disc. These experiments were conceived with the idea of deciding between the mechanical theory and the toxic theory of the production of optic neuritis. But the author's own conception of the modern position of the mechanical theory would seem to require a little bringing up-to-date. His experiments consisted in producing, by transocular injections, an increased pressure behind the sclera in the neighbourhood of the nerve entrance, and, as might have been expected, he only succeeded in producing very temporary effects on the vascular supply of the retina. His second series of experiments consisted in introducing various irritants into the same region. Here again he succeeded in producing such inflammatory changes as might have been predicted with considerable accuracy altogether apart from his experiments. We give the author's conclusions in his own words:—

"On physical grounds I consider it improbable that the influence of the raised intracranial pressure can extend as far as the papilla because of the capillary resistance of the intervaginal space of the optic nerve sheath. If however it does do so it must also show itself in the supravaginal space and in Tenon's capsule and produce exophthalmos. Conversely an exophthalmos from other causes must on its side raise the intracranial pressure.

"Previous experiments have not been able to produce choked disc by raising the intracranial pressure in any way which was free from objections. My own researches showed that locally raising the pressure by retrobulbar injections of indifferent substances gave rise to no signs of choked disc, but after injection of different inflammation-producing substances a marked œdema of the conjunctiva appeared.

"Clinical observations tend to show that without any rise of intracranial tension the picture of choked disc can be produced by toxins alone. Also in raised intracranial tension the existence of toxins must be accepted. These injure the cells of the Pacchionian bodies by which the cerebral-spinal fluid is absorbed. Only in a few cases can the volume of the tumour alone exercise an influence in raising the pressure."

Such are Dr. Thorner's conclusions, but they must be regarded rather as pious opinions since neither his experiments nor his arguments go any long way to the settling of the vexed question of the pathogenesis of choked disc.

LESLIE PATON.

T. AXENFELD (Freiburg). **Lehrbuch der Augenheilkunde.** Jena: G. Fischer, 1909.

THE mere mention of the names of those who have collaborated with Axenfeld in the production of this Text-book is sufficient to show the worth of the volume: they comprise Bach, Bielschowsky, Elschnig, Greeff, Heine, v. Hippel, Krückmann, Peters and Schirmer,—a strong team. The book extends to 670 pages, crowded with interesting matter and valuable information, brought, one need hardly say, up to date most thoroughly. The Editor is responsible for the introductory section dealing with medicaments, dressings, etc., for the second section dealing with the systematic examination of the eye, and for that dealing with diseases of the conjunctiva. Elschnig writes upon the use of the ophthalmoscope and on diseases of the cornea, Schirmer on injuries and sympathetic ophthalmia, as well as on diseases of the lachrymal organs; v. Hippel on the development of the eye and on diseases of the eyelids: Greeff on the retina and optic nerve, Peters on the orbit, on glaucoma, and so on. Perhaps this section on glaucoma hardly reaches the high level of excellence of some of the other sections, but that, we must admit, is a very severe test; from it we miss any reference to Bjerrum's symptom, and the new operations, which may perhaps be considered to be still on their trial, are not mentioned, except cyclodialysis. Schirmer's section on injuries, etc., is particularly good, and so, of course, is Axenfeld's on the conjunctiva. But we cannot particularise all the commendable portions as we should have to mention each one. A very good point in the book is the admirable, illuminating and elegant illustrations, of which there are a great many, 455 to be exact, besides nearly a dozen coloured ophthalmoscopic drawings. Where all are so good it might be invidious to mention certain individual ones, but we should like to draw attention to some in Krückmann's section on the uveal tract, which really excel all the others in beauty of execution and delicacy and elegance of reproduction, but they do not leave certain others more than a little way in the rear.

The last section, that on eye symptoms in systemic diseases, from the pen of Heine (who also writes that dealing with refraction) is a very valuable addition to such a book as that with which we are dealing.

It may seem a commonplace remark, but it has its value as showing what our opinion is of the worth of the book, to say that at the price at which it is sold (14 marks, unbound) it is almost absurdly cheap.

W. Czermak. **The Operations of Ophthalmology.** Second Edition: Edited by Prof. A. Elschnig (Prague). Vol. II. Berlin and Vienna, Urban and Schwarzenberg, 1908.

The second volume of this exhaustive treatise on the Operations of Ophthalmology is a book of over 700 pages, full of interest and instruction. It begins with a fairly lengthy section dealing with operations on the eye from a general point of view,—with fixation of lid and globe, with mischances incident on opening into the anterior chamber, such as hæmorrhage, entrance of air, and escape of vitreous, with the normal healing of wounds and circumstances interfering with the normal, such as re-opening of the wound, delayed closure, irido-cyclitis; and with after-treatment.

Next follows a section upon operations implicating the cornea alone, such as Saemisch's section, trephining, transplantation, tattooing, removal of pterygium and of new growths. Operations on the sclerotic, being comparatively few in number, take up much smaller space, and next follow those dealing with the iris,—iridotomy, iridodialysis, and—much more important—iridectomy. This is considered according to the various purposes for which it is intended,—reduction of tension, optical, etc.

The various operations upon the lens,—discission, extraction in its varied forms—occupy about 150 pages, and afford most valuable instruction. Every point is dealt with, every important modification of the general outline is discussed with care, point by point the operation is minutely described; then the more unusual operations are explained, *e.g.*, that of Czermak himself, who suggested a subconjunctival operation; then the procedures directed to the hastening of the ripeness of a cataract; then comes a section upon the choice of operation best adapted to an individual case, and other minor points.

The last portion of the volume is taken up with operations upon the vitreous and retina: on the subject of operations for the cure of detachment of retina there is naturally a good deal to be said.

Nor is the book merely a brainless compendium of described operations, the comments on various modes of procedure, their advantages, disadvantages, and relative merits, form an important element, greatly enhancing the worth of the volume: they merit careful study.

For all who wish to comprehend the various modes in which eye operations can be conducted, this book will prove a most useful possession, and for those who are dissatisfied with their own customary methods of procedure and wish to learn what other plans have been suggested, we know of no more valuable work. W. G. S.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

May 6th, 1909.

The President, Mr. Marcus Gunn, *in the chair.*

Card Exhibits.

Major Elliot :—

(*a*) An Evisceration Spoon.

(*b*) An Optic Nerve Hook for use in the Operation of Optico-Ciliary Neurectomy.

(*c*) An Elevator for use in Extirpation of the Lachrymal Sac.

With regard to the Optic Nerve Hook, the blade of the instrument is 5 cm. long, and the handle is 10 cm. The curve of the blade has been moulded on the antero-posterior curve of an average eye, and corresponds to a little less than half the circumference. At its extremity it is bent back 4 mm. in a curve whose opening has been so graduated that it will admit and hold firmly the optic nerve.

A case of Congenital Anterior Staphyloma in a Baby.—Mr. S. Stephenson.

Thomas H. was born March 23rd, 1909, under perfectly normal conditions without any instrumental assistance. The mother, when 3 months pregnant, was under treatment for a short time as a result of some boiling bacon fat splashing into her eyes. The baby weighed 4¼ lbs. Each palpebral aperture was found to be occupied by a globular, fleshy protrusion, in which no trace of cornea was visible; that on the left side was somewhat the larger. Both masses moved well in the usual directions; they were never covered by the lids.

The palpebral fissure extended outwards beyond the normal extent.

Accompanying this ocular condition, there were present other malformations, viz. :—

1. Microcephalus.
2. Hairs growing from the posterior surface of the ear and the helix.
3. Absence of the right testicle from the scrotum.
4. Little finger small and incurved.
5. No movement in the hip-joint; patella apparently absent, and knees cannot be flexed.

An unusual appearance of the Optic Disc, the result of a previous Papillitis.—Mr. G. Winfield Roll.

K.W., aged 6, came with history of defective sight in the left eye, which was believed to have existed since birth. The only illness had been a severe attack of measles in December 1908. There had been 4 other children, the first one only surviving 36 hours, while 3 other children showed no defect.

The whole of the disc seems larger than normal, with shallow depression of the surface and of a greyish colour; the centre of the disc is occupied by a whitish grey mass of irregular outline, and around the margin is a ring of choroidal atrophy with well-defined limits. The retinal vessels make exit in a fairly regular fashion all round the circumference of the disc, and a group of them, up and in, show white lines accompanying them. There is also some fine choroidal disturbance with pigmentation just above the disc. The other eye was normal.

The President considered this case was probably an acute congenital condition, resembling what followed intrauterine choroidal changes associated with neuritis.

A case of Nodular Leprosy affecting the Eyes.—Mr. E. Treacher Collins.

This patient, aged 5, and his father, were both the subjects of leprosy, contracted, probably, from a woman in same house, who had lately come from Riga afflicted with the disease. The father (aged 40) had suffered for 5 years, and the boy for 2 years, but in the latter it advanced much more rapidly than in the former. Naturally a bright, lively boy, he had become of late dull and apathetic. Numerous nodules were found all over the body, on the arms, legs, buttocks, back, and skin of the face. In the right eye were 2 long, yellowish swellings with blood-vessels on them at the upper and lower margins of the cornea; each extended some distance over the front of the cornea and only a narrow strip of semi-opaque corneal tissue remained unaffected between them. V = Counting fingers at 1 metre.

In the left eye a similar yellowish swelling was seen at the lower margin of the cornea extending some distance into it. The iris was discoloured and had some small yellowish nodules in it near the pupillary border up and out, and there were numerous posterior synechiæ. The vision = doubtful P.L.

Examination of sections and smears from a nodule on the leg showed the typical appearance of leprosy with an enormous number of acid-fast bacilli.

Symmetrical circumferential encroachment on the cornea by the limbus of the conjunctiva in the two eyes, with an arcus senilis inside the limbus; the patient being also the subject of progressive ptosis.—Mr. E. Treacher Collins.

Mrs. M. B. came for advice on April 29th, 1909, suffering from defective sight and inability to open the eyes. She had never been able to open the eyes properly, but this difficulty had increased considerably during the last 30 years, as shown by photographs taken at intervening periods. The ptosis was more marked on the left side than on the right, and there was some sinking in of the skin immediately beneath upper margin of orbits indicating some absorption of orbital fat.

Both corneæ showed symmetrical changes, a central oval portion alone preserving its transparency. The boundaries of the normal cornea could be made out though of an opaque and greyish appearance. Blood-vessels proceeded over the cornea from the conjunctiva. An opaque ring, like an arcus senilis, bounded the greyish area all round and was separated from the peripheral opacity by a semi-clear space like that seen with a normal arcus. There were some central lens opacities, and the vision was $^{6}/_{12}$ with correction in the right and $^{6}/_{12}$pt. in the left.

Cases of progressive bilateral ptosis have been described by Fuchs (*Arch. für Ophth.*, xxxvii, p. 234), all 5 being females. Beyond this, Mr. Collins could only recall one case of a similar nature, described and figured in the *Trans. of Ophth. Society*, vol. xxiv, p. 45, in a man aged 21.

Mr. Holmes Spicer considered that the whole condition might be of congenital origin.

PAPERS.

A short note on Tubercle of the Choroid, with an account of a recent case.—Dr. George Carpenter.

This paper related to five cases under Dr. Carpenter's care at the Queen's Hospital for Children, but the one specially referred to in the title could not be brought up for examination owing to the fact that the child had recently developed dangerous symptoms and was becoming comatose. Accompanying the paper excellent coloured drawings were shown to illustrate the various points.

Dr. Carpenter entered minutely into the description of the ophthalmoscopic appearances of the tubercles, dealing more especially with the pigmentation accompanying the choroidal exudation, and comparing the features noticed in tubercular and in syphilitic types of inflammation of the choroid, both recent and old; and he came to the following conclusions, some of which he had expressed before, both from his own observations and from those in conjunction with Mr. Sydney Stephenson.

(1) Acute miliary tubercle of the choroid can be commonly found by those who take the trouble to look for it.

(2) That the presence of choroidal tubercles by no means invariably indicates the existence of a general tubercular infection.

(3) That fine retinal pigment is a common ophthalmoscopic appearance over the surface of the tubercle.

(4) That miliary tubercles do not generally grow perceptibly larger, nor are there in these cases fresh deposits occurring within a few days, as stated by Fuchs.

(5) That miliary tubercle is generally situated in the central region of the fundus, and the spots are as a rule of small size, discrete, and limited to one eye.

(6) That chronic tubercular choroiditis cannot be distinguished from similar syphilitic choroiditis by ophthalmoscopic examination alone.

(7) That tubercle of the choroid may be met with in any form of tuberculosis, whether it be acute, chronic, or obsolescent.

Dr. Batten enquired what was Dr. Carpenter's opinion with regard to the percentage of tubercle in the choroid found in cases of tuberculosis, his impression being that it was not more than 10 per cent., whereas the examination of the cerebro-spinal fluid gave positive results in 70—80 per cent. of the cases, thus establishing the higher diagnostic value of lumbar puncture.

Dr. Carpenter, in reply, stated that from his experience he should have placed the percentage of tubercles found in the choroid at more like 50 per cent.

A case of Spring Catarrh treated and cured by Radium.—Messrs. McKenzie Davidson and Arnold Lawson.

A boy, aged 12, was first seen in April 1905, suffering from lachrymation and slight conjunctival discharge which had lasted nearly a year. On examination, there appeared the typical flat-topped elevations of spring catarrh scattered in great numbers all over the palpebral conjunctiva, with a good deal of reddening and some viscid discharge. The bulbar conjunctiva was healthy, there was no pain, and the cornea was quite clear, but the irritability was most marked in the morning. Eosinophile bodies were found in great abundance in the conjunctival secretion. The treatment at first adopted of complete rest for the eyes, with 4 per cent. yellow oxide of mercury ointment, only made the condition worse, so that 2 gr. to the ℥i copper drops were substituted, which appeared to give considerable relief for a time. Four months later, after a visit to the seaside, there was great exacerbation of the symptoms, but the condition responded again to treatment, so that there was a temporary improvement until January 1906.

As there appeared no sign of the catarrh yielding to the methods of treatment so far employed, it was decided to try cautiously the effect of radium; and at first the left eye, being the worse of the two, was subjected to exposure while the right eye was left alone. In all, 8 sittings were given between February 6th, 1906, and January 9th, 1907, both eyes being treated except on the first occasion; 44 milligrams of radium being applied for periods varying from 5—15 minutes, generally the latter. The condition began to show immediate signs of improvement, and at the end of the time stated both conjunctivæ were perfectly cured, and all the enlarged papillæ had completely disappeared. During the whole of 1907 the boy was kept under observation and went to school as usual. He was last seen on January 12th, 1909, when no trace of recurrence was visible; there was slight irregular colouration of the conjunctiva, and that covering the tarsus was yellowish-white and bloodless. Judging from the few cases which he had treated in this way Mr. Lawson considered that more successful results followed few sittings and a comparatively large dose of radium, rather than frequent sittings with a smaller dose of the salt.

Mr. McKenzie Davidson remarked that the difficulty was to get enough radium and the correct dosage; and another important point was to filter off those rays which were not required.

On the disappearance of the Iris from the Pupillary Area, following Injury.—Mr. M. S. Mayou.

Mr. Mayou, in this paper, explained that disappearance of the whole or parts of the iris as a result of injury had been frequently noticed, and was due to many causes, but the one he specially wished to refer to was the retraction of the iris into the angle of the anterior chamber owing to organization of fibrous tissue, giving rise to an apparent aniridia. The best known causes of disappearance of the iris were: (1) Incarceration in a scleral wound; (2) Avulsion of the iris in the rupture of the globe, caused by forcible expulsion of the aqueous; (3) Retroflexion of the iris, and (4) Rupture of the ligamentum pectinatum, cases of which have been described by Mr. Treacher Collins, in 1892, and by Buchanan and Müller.

Mr. Mayou gave the description of 3 cases which had occurred lately at the Central London Ophthalmic Hospital. The pathological examination of the different eyes had been made by himself, and photographs of the sections were placed on the screen. He also gave notes of one other similar case which had occurred under the care of Mr. Treacher Collins in 1890.

In all of these cases pathological changes of much the same type were found in all the sections, some perhaps rather more extensive than others. All were the results of penetrating injuries, and in two of them the foreign body was discovered in the eye; the injury had always been followed by cyclitis; and in each case the lens had been wholly or partially dislocated. One of the eyes was removed 48 years after the injury; in the upper and outer part of the globe in the ciliary region a scar was visible. In the anterior chamber was a white mass, the calcified remains of the lens. On one side the ciliary body was in its normal situation, while on the inner side it was retracted to near the equator; the iris was pulled over to the side and was adherent to the calcareous lens. In some of the cases the iris was retracted and folded, owing to the development of much fibrous tissue, so that the pupillary margin only just reached forward to the corneo-scleral junction, and there was marked ectopia, with pigmentary proliferation on the anterior surface of the iris. The angle of the anterior chamber was mostly occluded, but it is to be noted that although this is the case there is never any rise of tension; this is probably due to the fact that in these cases there is generally separation of the choroid at the anterior part of the eye opening up the supra-choroidal space, as well as a gap in the suspensory ligament following the dislocation of the lens. It was also observed that in this type of case the retina is usually detached and very often cystic.

The abuse of Atropine in Refraction Work.—Mr. R. R. Cruise.

This paper dealt with 140 cases examined with a view to test the efficacy of homatropine and cocaine compared with atropine in refraction work in the case of children up to 16 years of age. Seventy of these cases were tested under homatropine and cocaine (watery solution) in the strength of 1 per cent. of the former and 2 per cent. of the latter, the other 70 were treated with 2 per cent. of each.

The method of procedure was as follows: (1) Vision taken and recorded; (2) Homatropine and cocaine instilled 4 times in an hour;

(3) Retinoscopy performed; (4) Subjective test applied and result recorded; (5) Atropine ointment 1 per cent. was prescribed for home use, 3 times a day for 3 days; (6) Retinoscopy again performed; (7) Subjective test based on retinoscopy and result recorded.

Mr. Cruise found that out of the first 70 cases, the results under homatropine and cocaine were exactly the same as under atropine in 52; in 4 the amount of refractive error was greater under homatropine and cocaine, and in 14 greater under atropine. In the second half of the cases, treated with 2 per cent. of homatropine and cocaine, the results were 22 greater under homatropine and cocaine, and 3 under atropine.

In 20 cases he also estimated the distance of the near point, first under homatropine and cocaine, and then under atropine, using a +2D sphere in addition to the correcting glass for bringing the near point within measurable distance; and he found accommodation more thoroughly paralysed under homatropine and cocaine than under atropine.

From these experiments he was perfectly convinced of the greater value of homatropine and cocaine compared with atropine as a cycloplegic in refraction work.

Malcolm L. Hepburn.

ON THE TREATMENT AND PROGNOSIS OF PRIMARY GLAUCOMA.*

By Odillo Maher, M.D., M.Ch.Q.U.I., M.R.C.S. Eng.,

Consulting Ophthalmic Surgeon to the Sydney Hospital, Ophthalmic Surgeon to St. Vincent's Hospital, Sydney.

[After reviewing the history of operations for the relief of primary glaucoma, and the essential points in the pathology of the condition, Dr. Maher proceeds:—]

Iridectomy, in order to cure the glaucomatous condition, must afford some permanent means of exit for the intraocular fluid, either by re-opening the filtration angle, or by forming some new channel for drainage. Carbone has advanced a theory that iridectomy in glaucoma opens a channel for the drainage of the aqueous into the cut ends of the iris, which, it is asserted, do not cicatrise but continue to present a raw surface by means of which the aqueous drains away. When iridectomy is performed in recent cases, before adhesions have formed, permanent re-opening of the filtration angle may be hoped for; whereas, in long standing cases of chronic glaucoma, as there is no possibility of re-opening the filtration angle, iridectomy, when it cures the disease, must do so by establishing some vicarious means for the escape of the aqueous.

It has been noted by many observers that cystoid cicatrices are more liable to follow iridectomies performed on glaucomatous, than on non-glaucomatous eyes, the reason being that the scleral section heals more slowly, and the union is less firm. De Wecker was among the first to advocate that the section should be in the sclerotic, as the resulting cicatrix frequently allowed the aqueous to filter through it. In his opinion the formation of a filtering scar was the one essential in the treatment of chronic glaucoma, and the removal of the iris was quite unnecessary.

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* Paper read in the Ophthalmic Section of the Annual Meeting of the New South Wales Branch of the British Medical Association, 1908.

He therefore introduced and advocated sclerotomy as a substitute for iridectomy. Sclerotomy has but few advocates nowadays, as iridectomy with a scleral section possesses all the advantages of sclerotomy, and at the same time it affords a possibility of re-establishing a communication between the anterior chamber and the canal of Schlemm. In many operations for chronic glaucoma one not only fails to re-open the angle, but the wound in the sclerotic heals so firmly that no filtration can take place through the resulting scar. These are for the most part the cases in which iridectomy fails. The operation causes hyperæmia of the ciliary body, resulting in increased and more albuminous secretion, and as the filtration angle is closed and the edges of the scleral wound firmly united, increased tension results. Then it becomes necessary to perform a second operation, either another iridectomy or a sclerotomy, as the eye soon goes blind unless the tension is permanently relieved. If any advantage is to be derived from iridectomy in chronic glaucoma which has existed for a considerable time, since it is practically impossible to re-open the filtration angle our aim should, in my opinion, be to establish a filtering cicatrix.

Bader was a strong advocate for a cystoid cicatrix, which he made by performing a free sclerotomy, getting a large subconjunctival prolapse of iris. Lagrange endeavours to get a filtering scar by first making the usual scleral section, and then, before performing the iridectomy, cutting with a fine pair of scissors a small piece out of the anterior lip of the wound. Holth having been impressed by the satisfactory results obtained from a cystoid cicatrix, aims at establishing one by getting the iris to prolapse into the wound. He considers it unnecessary to remove any of the iris. This appears to me to be simply a modification of Bader's operation. In Volume XXIII. of the *Transactions of the Ophthalmological Society* is published a paper by Major Herbert on Subconjunctival Fistula Formation in the Treatment of Chronic Primary Glaucoma which is worthy of most careful perusal. Berry, in a recent communication which appeared in the *Edinburgh Medical Journal* advises that "cases in which Iridectomy followed up by myotics fails, should be treated by the formation of a cystoid cicatrix." The difficulty, however, often is to establish a satisfactory cystoid cicatrix.

For the past thirteen years my aim has been to establish such a cicatrix in cases of chronic glaucoma of long standing. I operate in the following manner. Having made the usual scleral section with a broad keratome, I drag on the iris with one or, preferably, two iris forceps—one in each hand—detaching its base at the part corresponding to the scleral section. The loop of iris thus formed is left well prolapsed for a week, when it is snipped off with an iris scissors level with the sclerotic at each angle of the wound. Sometimes I vary the procedure by cutting the iris at the time of the operation at one angle of the wound, and then, by dragging on it with the iris forceps, tear it away from its attachment corresponding to the section, in the hope, if possible, of re-establishing the communication between the anterior chamber and the canal of Schlemm. Instead of now completing the iridectomy, I leave prolapsed, at the other angle of the wound, a large portion of the tag of iris thus formed, and at the end of a week snip it off level with the sclerotic. By this means I generally obtain small flat cystoid cicatrices. The same result may often be obtained, but with less certainty, by performing an iridectomy in the usual way, but cutting the iris so that it is left slightly entangled at one, or both, angles of the section.

Leaving the iris prolapsed for a week before cutting it off causes but little irritation, and ten days after the operation the bandages can usually be dispensed with. In one case, however, plastic iritis set in a few days after the operation, and the eye, which was almost blind, became totally so. Fortunately in this case I had previously operated successfully on the other eye, and had established a satisfactory filtering scar.

I have performed this operation many times during the past thirteen years, and regret that I have not kept notes of the cases. Some of them I have seen or heard of who years after the operation retained good vision, and I have not seen any of these cases in which a cystoid cicatrix has been formed go blind. It does not follow, however, that this has not happened, for one easily loses sight of one's patients; but the probability is that if such did occur I should have heard of it. One case I have had regularly under observation for about six years, in which I operated on both eyes, producing a cystoid cicatrix in one, but not in the other. The sight of the eye with the cystoid cicatrix has deteriorated very little, if at all, while the sight of the other gradually failed, and the eye has been blind for the past three years.

I admit that eyes with cystoid cicatrices run a risk of infection, and that the entanglement of iris no doubt increases the liability to sympathetic ophthalmia. However, these unfortunate sequelæ are in my experience extremely rare, and I consider the advantages gained by producing a filtering scar in chronic glaucoma so great that they quite outweigh these possible disadvantages.

I would not advocate the formation of a cystoid cicatrix when the operation for chronic glaucoma can be performed early, before the adhesions have taken place at the filtration angle; but when the disease is of old standing, and on account of the firm adhesions between the base of the iris and the adjacent cornea it is no longer possible to re-open the communication between the canal of Schlemm and the anterior chamber, I certainly think our aim should be to establish a cystoid cicatrix. The difficulty is to know when these adhesions exist and when they do not, but generally speaking the longer the disease has existed the less likelihood is there of re-opening the filtration angle.

There are certain cases of chronic glaucoma in which it is not wise to operate. If the patient be old and feeble; if the field be contracted all round close up to the fixation point, especially if the progress of the disease be slow, and the centre of vision good; or if there be retinal hæmorrhages, it is wiser not to operate, but to treat such cases with myotics.

The results obtained by iridectomy in chronic glaucoma are often not satisfactory. According to von Graefe half the cases are permanently cured, about one quarter relapse and require a second operation, while the remaining twenty-five per cent. go blind in spite of all treatment. Nettleship, Hirschberg and other ophthalmic surgeons have published statistics which practically agree with those of von Graefe. On the other hand Schleich has reported his experience of one hundred and two cases in which iridectomy was performed. Of these, eight per cent. became blind immediately, or soon after the operation, seventy-six per cent.

gradually lost their sight, while two years after the operation in only sixteen per cent. was there no further loss of vision. He obtained much better results in a series of forty-nine cases treated by the regular and persistent use of myotics. Of the forty-nine cases treated in this way, at the end of two years the vision of thirty-nine per cent. remained stationary, while sixty-one per cent. became worse. He is opposed to operating in chronic glaucoma, and advocates treatment by the regular and persistent use of myotics.

Other well known ophthalmic surgeons hold similar views. It is difficult to understand how skilled operators obtain such widely different results.

I shall conclude by again briefly stating my views as to the treatment of chronic glaucoma. Except in the cases already referred to one should operate and the sooner the better, performing an iridectomy according to the rules laid down by von Graefe, when the disease is in the very early stage; but when, as in the majority of cases which come under our notice, it is of long standing, and it is therefore no longer possible to re-open the filtration angle, our aim should be to establish a cystoid cicatrix.

A NEW DANGER ARISING FROM THE USE OF PLATED INSTRUMENTS IN OPHTHALMIC OPERATIONS.

By W. C. Rockliffe, M.A., M.D., M.R.C.S.,
Ophthalmic Surgeon, Hull Royal Infirmary.

Having recently had the misfortune to lose an eye from acute panophthalmitis after extraction, the result, I am inclined to think, of a unique complication, the following may be of value as a warning to others.

A. B., aged 73, was admitted to the Hull Royal Infirmary on February 15th last, with ordinary senile cataract. He was a perfectly healthy old man, with no trace of catarrh or mucocele. The eye, as is my custom, was cleaned and covered with a carbolic pad the night previous to the operation. Every usual aseptic treatment was carried out during and after the operation, which was performed on February 19th, and was uncomplicated throughout.

On the following morning, February 20th, the lids were somewhat puffy, but not more than is frequently seen as the result of pressure of the speculum; nevertheless, there was a slight mucous discharge and the cicatrix did not look perfectly healthy.

February 21st. The eye was in a state of acute panophthalmitis. He was ordered leeches and perchloride irrigation every two hours.

February 22nd. The galvano-cautery was freely applied to the cicatrix; nevertheless, the pain and distension of the eye with pus became intense during the day, and the House Surgeon did a paracentesis during the night, with great relief to the patient.

February 23rd. Excision. Prior to this, in the early morning, during an irrigation, a bright foreign body was noticed floating away with the lotion, and was fortunately secured by the nurse.

This turned out to be a piece of plating measuring about 1·5 m.m. × 1 m.m., and clearly came from some instrument. I therefore examined the forceps and De Wecker's scissors and found a corresponding deficiency of the plating near the hinge on the scissors, and a second larger strip almost detached. On inspecting my other plated instruments, some of them also showed signs of the plate peeling off.

I assume, that during the iridectomy the fragment had dropped unseen into the anterior chamber or the wound and had caused the panophthalmitis.

The question naturally arose, how could this septic condition have occurred, everything having been thoroughly sterilized and every aseptic precaution having been carried out?—especially as it has been stated that a copper foreign body in the anterior chamber never causes suppuration of the vitreous? Further, as all instruments after cleansing are placed in pure alcohol?

Could the carbonate of soda in the boiling sterilizer, the 20% carbolic in the instrument dish, or the alcohol after cleaning, have had anything to do with the cause of the separation of the plating?

By chance being at the Royal London Ophthalmic Hospital, I mentioned the case to several, including Mr. Bishop Harman; he suggested that a fault in the copper-nickel plating in the presence of a saline solution might set up a battery action; this would explain the separation of the plating, and also the subsequent inflammation produced in the eye. He kindly undertook to submit the fragment to an expert Cambridge physicist, who reported "that he thought that pieces of double metal like this would very much strengthen the electrolytic action, if they got into the saline fluids of the eye, and can quite believe that it would produce much greater inflammation than either metal singly. The strength of the action would depend somewhat upon the E.M.F. of a copper-nickel couple in the salt solution, but even if this were small the fact that the two metals are in actual contact would of course produce a comparatively strong current."

Since then Mr. Bishop Harman has obtained more such scales of plating and submitted them to Dr. Crocker, of the South-Western Polytechnic Institute, Chelsea, London, who reports:—

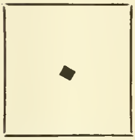
"The E.F.M. of nickel and copper electrodes in normal saline solution is 0·02 volts. When the electrodes are placed in perchloride of mercury solution, and the circuit closed, calomel deposits pretty readily on the nickel and mercury on the copper. It seems probable that the effect was primarily due to the action between the couple itself and the organic fluids of the eye, judging by the ease with which the couple corrodes near the surface of the liquid, in air."

The above reports appear fairly conclusive as to the cause of the peeling off of the plating, and of the subsequent acute panophthalmitis, and I am much indebted to these gentlemen for their reports.

That the peeling off of the plating on steel instruments (although so far as I am aware not hitherto commented upon) is not so uncommon as it would appear, is proved by the findings of Mr. Johnson Taylor (Norwich) and my colleague, Mr. Roe. When I mentioned this case to them they proceeded to inspect their instruments, and in each case parts of the plating on pairs of De Wecker scissors were found partly or almost completely detached.

In conclusion, I would suggest to all using plated ophthalmic or other instruments to examine the same thoroughly prior to their use, and I much doubt the advisability of ever using such instruments again.

Probably most ophthalmic surgeons of experience can recall cases of acute panophthalmitis following extraction, which they have been absolutely unable to explain. The above may suggest a possible cause of an occurrence as to which I should, in my case, have remained in painful ignorance had not my nurse detected the foreign body.



The spot in the square is the exact size of the detached piece of plating.

REVIEWS.

G. Wernicke. **An Experimental, Clinical and Pathological Contribution on Cyclodialysis.** From the Breslau University Eye Clinic. *Klinische Monatsblätter für Augenheilkunde*, November—December, 1908.

This paper contains more or less detailed reports of sixty-one patients operated upon by cyclodialysis at Breslau, including the later results of twenty cases already published by Heine. And the published accounts up to date of experiences of cyclodialysis elsewhere, mostly less favourable, are reviewed and criticised from the Breslau standpoint. The arguments are, therefore, all on the one side. Failures and drawbacks are explained away.

Krauss opposed the operation mainly from the histological examination of rabbits' eyes experimented upon. Wernicke points out that the sclera and ciliary body are too thin in these eyes to be very suitable for the experiment. (Even dogs' eyes, four of which were operated upon and examined by Wernicke and Heine, are somewhat unsuited owing to the hæmorrhage which is occasioned from the free venous plexus in the sclerotic near the corneal margin). The fibrous bands which were found by Krauss in the vitreous, and the marked atrophic changes in the ciliary body, were attributable to wounding of the vitreous and of the choroid. It is possible that atrophy of the small separated portion of the secretory apparatus of the eye may partly account for reduction of tension.

From the few glaucomatous eyes which have as yet been examined after this operation, it is not possible to state whether the procedure can re-open the angle of the anterior chamber. Nor is it easier to determine the permanency, or otherwise, of the connection established between the anterior chamber and the suprachoroidal space. This space is not readily shewn in histological preparations of normal eyes; it must be still more difficult to demonstrate in eyes with raised tension. In a dog's eye, enucleated forty-eight hours after cyclodialysis had been performed upon it, Wernicke found the ciliary body and choroid for the most part closely applied to the sclerotic. Even after operation upon freshly enucleated pigs' eyes, sections of the hardened and embedded eyes failed to show the suprachoroidal space with certainty. It is probably owing to this early readjustment of the tissues that detachment of the choroid has been observed clinically only twice by Heine after this operation, and not at all by others. Such detachment is also too peripheral to be easily seen.

As regards the five operations—all failures—reported by Weekers from Axenfeld's clinic, we are reminded that they were all done upon cases admittedly unfavourable for operation.

Among Boldt's thirty-seven operations from Deutschmann's clinic only six were entirely without result. More or less diminution of tension was obtained in all the others, and in twenty-five of the cases the reduction was lasting. Boldt concluded that in no case had the operation presented any particular difficulty and in no case had it caused any permanent injury to the eye such as might have prejudiced subsequent operation by this or other method. This operation was apparently especially to be considered in cases where the visual field was much contracted.

The forty-eight cases published by Meller from Fuchs's clinic showed that the new operation, apart from the cosmetic and optical advantages of the round pupil, was preferable to iridectomy in certain cases because in them it was decidedly less dangerous. It was to be chosen in very hard eyes with very shallow chamber, in all hæmorrhagic glaucomas, and where the fellow eye had been lost through malignant glaucoma or through severe hæmorrhages following iridectomy; in aphakic eyes with fluid vitreous; and in hydropthalmic eyes. Thus we might escape such dangers as that from prolonged emptiness of the anterior chamber, loss of vitreous, injury of the lens, and profuse intraocular hæmorrhage. It was to be preferred also in cases where the iris was atrophic, or where iridectomy had already failed. Meller had concluded that cyclodialysis was a valuable means of treatment in some cases where no other operative measure was applicable. And it could be repeated several times if necessary.

In all, seventy-six cyclodialysis operations were performed at Breslau upon sixty-seven eyes, six patients having both eyes treated, and nine eyes having repeated operations.

There were eleven operations on nine acutely glaucomaotus eyes. From these there were six satisfactory results, but only three of them were observed for over a year; two transient reductions of tension; and three operations without results.

There were four hæmorrhagic glaucomas treated. There was one good result, observed however for less than a year, one transient effect, and two without influence on the tension.

Among subacute, chronic and absolute glaucomas there were thirty-six operations on thirty-one eyes. These gave twenty good results, but only twelve of them had been seen for a year or more. There were eleven temporary reductions of tension, and five cases were uninfluenced.

There were nine operations on seven buphthalmic eyes: five with satisfactory effect, four of these having been seen more than a year later; two with only temporary benefit; and two without influence.

There were nine eyes treated for chronic simple glaucoma, giving five good results; only one of these, however, had been observed for a year. There were three cases of transitory relief and one ineffectual operation.

Five cases of corneal staphyloma with secondary glaucoma were all relieved.

There were two traumatic glaucomas. In one the tension was unrelieved, the other case ended in phthisis bulbi.

Of the total operations, therefore, 57 per cent. were successful, so far as observed, and about half of these cases had been tested a year or more later. There were 25 per cent. of temporary reductions, and 18 per cent. of the cases were uninfluenced. But of the fourteen glaucomas forming this last group, three were cured and four temporarily relieved by second operations. Of the remaining seven complete failures, six were in eyes which had already been unsuccessfully and in some cases repeatedly operated upon by other methods. It is especially to be noted that in two cases the anterior chamber had failed to refill after previous iridectomy and sclerotomy; it re-formed, however, after the cyclodialysis.

A few words are added upon operative technique. Latterly the scleral incision had been placed 2 or 3 mm. further back than formerly, in order to obtain a larger sweep with the stylet, and so to detach more of the ciliary body. And, especially in the later cases, a drop of ½ per cent. eserin solution had been instilled after operation, to increase the separation of the tissues by drawing the root of the iris away from the sclera.

As regards complications, hæmorrhage into the anterior chamber is soon reabsorbed. Bleeding into the vitreous is usually met with only in the most acute inflammatory and in hæmorrhagic glaucomas—cases in which iridectomy is also liable to give rise to profuse destructive hæmorrhage. Severe iritic reaction is confined to severe inflammatory cases. Small wounds of the iris are of no consequence, and accidental iridodialysis may be actually advantageous. Perforation of the choroid is not to be feared with a very small scleral incision. Choroidal prolapse has been observed only in hydrophthalmic eyes with thinned sclerotic. Cloudiness of the cornea from injury to the endothelium is mostly transient, and is situated too peripherally to be of any importance.

On the whole these results cannot be considered very impressive or convincing. And it would perhaps serve to prevent possible misunderstanding if the purely temporary reductions in tension were grouped with the complete failures. The prospect of cure, even by the later operations with rather more extensive separation of the ciliary body, is scarcely sufficiently assured to make it appear probable that cyclodialysis can replace simple iridectomy in the treatment of the more common types of glaucoma, even though the newer operation may be somewhat safer. But this, after all, is not the main point. The future of cyclodialysis as a means of treating the ordinary run of glaucomatous eyes must depend apparently upon its power to compete, not with simple iridectomy, but with the "filtering cicatrix" operations. The possibilities of the latter, with regard to safety, certainty and uniformity of result, are certainly great, though these possibilities have been little explored as yet. The small incisions required for these operations, together with slow evacuation of aqueous, make for safety. And the promise of uniform effectiveness is such that in the future we can be satisfied with nothing less than almost mathematical certainty in the reduction of tension.

One feature of cyclodialysis may however secure for it a permanent place in the treatment of limited groups of cases. The gradual reduction of tension brought about by cyclodialysis, in some cases at least, is greatly in favour of the procedure in eyes with diseased blood-vessels, perhaps also in eyes with very limited visual fields and in hydrophthalmic eyes. In these last, however, the readiness with which permanent leakage may be secured through the greatly thinned sclerotic by means of minute subconjunctival paracentesis openings, has not yet been sufficiently realized.

H. Herbert.

O. Lindenmeyer (Frankfort). **Posterior Sclerotomy in Malignant Glaucoma.** *Klinische Monatsblätter für Augenheilkunde*, March, 1909.

The writer reports a case in which posterior sclerotomy on the sixth day after iridectomy rescued the eye from loss through malignant glaucoma.

The patient, a woman, age not stated, had lost the sight of the right eye through glaucoma. A sclerectomy, done for the relief of pain and tension after blindness was complete, had succeeded well, leaving the eye with normal tension, clear media, excavated disc, freedom from pain, V = 0.

She was first seen by Lindenmeyer seven years later. Right eye as above. Left eye normal:—V = 1, visual field entire, Tn, disc not cupped.

Three years later the sound eye showed early symptoms of glaucoma—recurrent obscurations relieved by pilocarpine, commencing cupping of disc, contraction of field, T not markedly raised. Iridectomy was performed—incision with lance knife, broad excision of iris, position of iris pillars good, no complication. Forty-eight hours later chamber empty, cornea cloudy, pain and injection, T high. Eserine and pilocarpine without effect. Four days later the same conditions exaggerated, with chemosis of conjunctiva and V reduced to perception of hand movements. *Posterior sclerotomy*, the incision being meridional, 3 mm. long, 5 mm. distant from the limbus, in the lower outer quadrant, gave free exit to a quantity of serous fluid. The anterior chamber was immediately re-established and at the same time moderate bleeding into the chamber occurred. From that time forward the condition of the eye improved, the anterior chamber being maintained, the tension returning to normal. The iridectomy scar became ectatic. Ultimately $V=\frac{1}{4}$. Essentially the same condition was found when the eye was re-examined four years later.

The author reviews, though not completely, the literature of malignant glaucoma, which is scanty. To Adolph Weber belongs the merit of having devised and first successfully practised a method of relieving this alarming condition.[1] He recognised that the malignant complication was caused by the lens being displaced forward by unrelieved pressure behind it. He relieved this pressure by enabling fluid to escape from behind the lens and at the same time replacing the lens by exercising pressure upon it through the cornea.

Lindenmeyer, apparently on the evidence of the case here recorded, maintains that the scleral puncture will suffice without the pressure on the cornea. His own case was fortunate in this respect but his inference is certainly not universally true. Weber gave a warning as to the insufficiency of either step in the absence of the other. The present reviewer has published evidence which shows that long continued pressure on the cornea—ten minutes—may be required in such a case before the anterior chamber begins to be re-established by the entrance of fluid. He would point out also the far more important fact, to which Lindenmeyer does not refer, that the occurrence of this malignant complication may be avoided altogether by the making of a scleral puncture to relieve pressure behind the lens before the iridectomy is performed.[2]

P .S.

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1. *von Graefe's Archiv*, Vol. 23, p. 86.

2. Norris and Oliver, Vol. 3, p. 679.

Bettremieux. **The Action of Simple Sclerectomy on the Sanguineous Circulation of the Eye.** *La Clinique Ophthalmologique*, 10th December, 1908.

Up to the present sclerectomy has been regarded as acting in favouring the excretion of the intra-ocular fluids by the creation of either a filtrating cicatrix or of a fistula, but Dr. Bettremieux believes that it has an action on the circulation of the blood in the eye. In the course of the operation of simple sclerectomy, after the dissection of the conjunctiva, the eye being under the influence of adrenalin, the operative field represented by the surface of the sclerotic is ordinarily bloodless; after the removal of several shavings of the sclerotic, there is tangentially to the limbus a surface of about two millimeters broad by six to eight long which is the seat of a sanguineous oozing, the deeper vessels having been opened; the conjunctival sutures which complete the operation place this refreshed zone of sclerotic in contact with the conjunctival and subconjunctival vascular network and thus vascular anastomoses are formed at this level.

In some cases of interference with the intra-ocular circulation we see the anterior ciliary veins much swollen, and we are following the indication thus given by Nature when we endeavour to promote the collateral circulation.

Dr. Bettremieux points out that simple sclerectomy presents some analogy with the operation of Talma, which consists in preventing the interference with the circulation in atrophic cirrhosis by creating adherences between the omentum and the abdominal wall and consequently favouring the establishment of a collateral circulation more important than that which normally exists between the veins of the portal system and the vena cava.

We sometimes see a burn of the limbus followed by passing glaucomatous phenomena; in such cases there has been an obstacle to the circulation by the destruction or compression of vessels; wherefore it seemed logical to try and cure glaucoma by ameliorating the pericorneal circulation of the eye by creating, as by simple sclerectomy, anastomoses between the deep vessels of the sclerotic and the conjunctival and subconjunctival vascular network. In this way Dr. Bettremieux thinks that simple sclerectomy should aid the circulation of the blood in the eye, and consequently stimulate the nutritive processes, and he thus accounts for its beneficial action in certain cases of glaucoma, opacities of the vitreous, detachment of the retina and keratitis.

E. M. LITHGOW.

OGUCHI (Tokyo). **Contribution to the Anatomy of Corneal Fistula, with Remarks on a Particular Form of Excavation of the Optic Disc due to Secondary Glaucoma (Hernia of the Vitreous).** *Von Graefe's Archiv für Augenheilkunde*, 70, 1.

HITHERTO Czermak alone has given us the anatomical findings in corneal fistula. He examined five examples. In all some portion of the free border of the iris had become engaged in a corneal perforation. In only one case was there a true fistula; in this case the whole pupillary margin had become fixed in the corneal opening. In the other four cases only a portion of the iris margin was engaged. There was no patent canal; the aqueous escaped by filtering through loose iris tissue. The development of firm cicatricial tissue had been prevented apparently by the constantly varying pull of the attached sphincter muscle. Earlier clinical observations had already shown that a "fistula" is always situated towards the centre of the cornea.

Oguchi gives the results of a minute anatomical investigation of an eye blind from the effects of adherent leucoma following gonorrhœal conjunctivitis and perforated ulcer. A large portion of the shrunken and flattened cornea was leucomatous. A little upwards and inwards from its centre a dark point, or fistula, was seen. The clinical history recorded numerous sudden attacks of glaucomatous pain and congestion, due to repeated closure of the fistula.

As in Czermak's four cases, examination showed no fistulous track. The dark point in the leucoma, about 1 mm. broad, represented the upper-inner portion of the pupillary margin of the iris. The corneal perforation had evidently been quite small, and completely filled by the iris, whereas in Czermak's cases the opening had been large and the iris only adhered at the one side.

The impacted iris had become thinned to 0·2 m.m. about its middle, but its texture was quite loose. The retinal pigment layer was absent; this, as shown already by Asayama, allowed of filtration of aqueous through the parenchyma of the iris. There was an epithelial covering continuous with that of the cornea, partly raised by vesicular spaces, and presenting a rupture at one place. There was practically no cicatricial tissue in the iris or on its surface, except peripherally, uniting it to the cornea. Centrally the union of the iris with the cornea was mostly direct. The posterior surface of the iris was fairly even, without the trough-like depression noted in all Czermak's cases. Elsewhere the thinned iris was in contact with the cornea in front and with the lens behind. The angle of the anterior chamber was completely closed. Thus the impacted pervious iris tissue constituted the only outlet for aqueous. The alternations of minus and plus tension recorded clinically were accounted for by recurrences of rupture followed by healing of the epithelial covering.

Attention is next directed to the peculiar form of glaucomatous excavation of the optic papilla found in this case. There was an ordinary cup 1 m.m. deep, and in the floor of this a tubular depression ·7 m.m. deep. Thus the depth of the whole funnel-shaped depression was 1·7 mm. Schweigger has described a funnel-shaped excavation of the disc in old-standing glaucoma, but with the tubular portion quite short and representing the enlarged canal of the central vessels. Oguchi's case more closely resembles Elschnig's case of "hernia of the vitreous" in a 20-year-old glaucoma. In both cases there was a localized depression in the floor of a cupped papilla, situated somewhat laterally, extending through and beyond the lamina cribrosa, and filled with firm vitreous. The depressions differed in shape and in the tissue constituting their walls. Elschnig's depression was lined throughout with fibrous tissue, whereas in Oguchi's case the floor was partly made up of breaking-down medullated nerve fibres. The nerve fibres in the immediate neighbourhood were markedly degenerated, and at a greater distance less so. Though there were no other actual spaces formed by this atrophic process, Oguchi regards the tubular depression as due to the breaking-down and disappearance of a length of nerve-fibre bundle. The width of the tube was somewhat greater than that of a nerve fibre bundle. He considers that the findings support Schnabel's contention that glaucomatous cupping is not due directly to pressure upon the lamina cribrosa. Schnabel's theory, based upon the examination of over 100 glaucomatous eyes, is that the excavation of the papilla is due essentially to a localized atrophy of nerve fibres, extending behind the lamina cribrosa, and that the lamina simply falls back owing to reduced support. The theory was rejected by Schreiber and Erdmann. Oguchi explains an atrophy of nerve fibres limited to the neighbourhood of the optic papilla, as due to the enlargement of the posterior lymph passages of the glaucomatous eye—an enlargement brought about by the blockage of the anterior main exits for lymph. Lymph spaces surround the nerve fibre bundles, separating them from the fibrous septa of the nerve, and are particularly large about the lamina cribrosa. Fluid from the vitreous finds it way hither not only by means of the central canal of the vitreous, but also by passing through capillary openings in the hyaloid membrane and internal limiting membrane of the retina into the nerve fibre layer of the retina. Corroboration of this view of indirect pressure atrophy of nerve fibres is found in Galezowski's conception of simple glaucoma as a lymphangitis localized at the papilla; also in Schreiber's description of small spaces found especially in the nerve fibre layer of the retina near the disc, also before and behind the lamina.

H. HERBERT.

ISCHREYT. **A Case of Glaucoma Secondary to Senile Cataract.** *Zeitschrift für Augenheilkunde*, December, 1908.

A FEW cases in which it has been thought that an attack of acute glaucoma has been secondary to senile cataract have, it seems, been recorded, but the present case is more conclusive than any previous ones owing to the shortness of time elapsing between the onset of glaucomatous symptoms and the supervention of blindness, and also to the fact that the results of a pathological examination of the enucleated globe are recorded. The case occurred in a woman, who was 78 years old when commencing cataract in each eye was first diagnosed. Nineteen months later she could still count fingers with the right eye, while with the left her vision was $^1/_{10}$. Five weeks afterwards, she reappeared, having been ill with symptoms of acute glaucoma in the right eye almost ever since the last visit. The eye was totally blind and two days later was enucleated.

So far, there was nothing to shew that the glaucoma was not in fact primary, but the results of the pathological examination go some way to prove that this was not the case. In all four principal meridians, at a point about 1·6 m.m. in front of the ciliary body, lens, iris and cornea were in contact. The filtration angle itself was obliterated, but only for a space of 1·5 m.m., the iris and cornea beyond this being freely separable. The anterior chamber was of course very shallow. The spaces of Fontana and the canal of Schlemm were obliterated or occupied by proliferating cells. The diameter of the cornea itself was remarkably small, only 10 m.m. The dimensions of the lens could only be measured after it had undergone the hardening process involving a considerable shrinkage, but the folding of the lens capsule is taken as evidence that it had been of large size There was no glaucomatous cupping of the disc and the nerve fibres were normal. The cataract itself was confined to the sub-capsular layers of the cortex, the nucleus remaining clear.

The author's theory is that the cataractous process in this case caused a swelling of the lens, which, there being an unusually small cornea, was sufficient, according to Priestley Smith's theory, to cause an obliteration of the anterior chamber and an attack of acute glaucoma. The theory is plausible, but its weak point seems to be the want of proof that cataract does in fact ever lead to enlargement of the lens. If it does the clinical bearing of the case seems clear and important. In cases of unripe senile cataract we should always measure the diameter of the cornea, and when this is small we should not delay the performance of a large preliminary iridectomy.

A. H. T.

W. Tschirkowsky (Kasan). **Glaucoma in Connection with Albuminuric Changes in the Eye.** *Klinische Monatsb. f. Augenheilkunde*, Sept., 1908.

While glaucoma in relation to its various forms of origin has been the subject of much writing, it is rare to find references to it as a complication of retinal affections arising from renal disease, and this is all the more remarkable, considering that disease of the retina is a common occurrence in persons suffering from albuminuria. Among the patients of more advanced years that suffer from glaucoma there are probably many with evidences of arteriosclerosis, in whom changes in the kidneys eventually make their appearance; but it is comparatively rarely that one is able to prove that renal disease is fundamentally the cause of the glaucoma.

Tschirkowsky distinguishes three clinical varieties or groups of retinal affections in which "albuminuric" glaucoma may occur, viz.:—

1. Ordinary albuminuric retinitis.
2. Albuminuric detachment of the retina.
    - (*a*) the common form.
    - (*b*) the rarer, hæmorrhagic form.
3. Thrombosis in the central vessels of the retina.

A resumé of the various cases illustrating the first group is given; extensive changes of an inflammatory and degenerative character were noted in the retina and choroid, and these were held to have a bearing on the occurrence of the glaucoma. Yet in none of the cases did the writers give a direct answer to the question as to the direct connection between the glaucoma and the retinitis.

To the several cases of the second group that have been reported Tschirkowsky adds that of a young woman, 21 years of age, who became blind in one eye within a few days. A detachment of the retina could be made out in this eye and was diagnosed as being of the hæmorrhagic variety: the tension was increased. The other eye showed typical albuminuric retinitis, and there was general evidence of chronic nephritis.

On microscopical examination of this eye the most striking changes were found in the vessels of the retina and choroid, and particularly the latter, in which extensive thrombosis of a vena vorticosa could be seen: this was undoubtedly the cause of the large effusion of blood that was present behind the retina. The smaller veins of the choroid, and even the choriocapillaris, were similarly affected, while the arteries were for the most part normal in appearance. The vessels of the retina showed thickening or hyaline degeneration of their walls and thrombosis, thereby causing a diminution or even complete obstruction of the lumen.

Disease of the venæ vorticosæ has been regarded by various writers as the great factor in the causation of primary glaucoma; the presence of such disease, however, is as a rule, not of first importance in its etiology, although in this case it must be held that it played the chief part in producing the retinal detachment, and the rise of tension.

In illustration of the third group Tschirkowsky gives details of a young man (æt. 25) with parenchymatous nephritis who complained of a mist before one eye; ophthalmic examination revealed the presence of thrombosis of the retinal vein. During the period that he was under observation it was noted that the anterior chamber became shallower and the tension rose until the eye assumed the appearance of a typical inflammatory glaucoma and had to be excised.

Although the clinical signs here pointed to thrombosis the microscopical examination showed none, but a marked peri- and meso-phlebitis in the main central vein, the accompanying artery showing only very little evidence of sclerosis. The pathological condition of the vessels may fairly be attributed to the renal disease. It is noteworthy in this case that only one eye was affected (the other eye being quite sound), and that in place of a typical albuminuric retinitis the clinical picture of venous thrombosis was found. In other cases, however, such as those described by Coats, Harms and others, thrombosis of the central vein or an endarteritis proliferans of the artery was present.

In reviewing the various opinions suggested as to the exact origin of the glaucoma, the writer draws attention to the fact in his case that for several days before the attack of glaucoma came on there was a considerable though varying diminution in the depth of the anterior chamber, but not accompanied by any rise of tension. This certainly suggested that an increase in the volume of the vitreous, produced perhaps by œdema, may have contributed to this symptom.

In all of the above-enumerated groups the main pathological changes are found in an affection of the blood-vessels, the whole vascular system of the retina in the case of albuminuric retinitis, the vessels of the choroid and particularly the vena vorticosa in the cases of detachment, and in the third group the main trunk of the central retinal vein.

Thos. Snowball.

EDWARD B. COBURN (New York). **A New Applantation Ophthalmometer.** *Annals of Ophthalmology*, July, 1908. COBURN classifies the methods employed for determining ocular tension into:—

I. Direct: intraocular.
II. Indirect: extraocular.
  (*a*) By opthalmometric determination of the curvature of the cornea.
  (*b*) By digital pressure.
  (*c*) By instrumentation: opthalmo-tonometry.
    (1) Applantation tonometry.
      (*a*) Applantation effected by a given weight or force.
      (*b*) Force necessary to effect a predetermined area of flattening.
    (2) Impression tonometry.
      (*a*) Impression effected by a given weight or force.
      (*b*) Force necessary to cause a given impression.

All the methods are subject to error. The first is most accurate but cannot be employed with uniformity on the human eye. The extra-ocular methods fail in accuracy because proper allowance cannot be made for variations in the resiliency of the ocular tunics and the curvature of the eye.

With the single exception of the tonometer of Maklakoff, the instruments depend for their measurements upon weighted levers or springs and their readings are recorded on empirical scales, and if comparison is desired with intra-ocular manometric determinations, the relations of these scales must be evaluated.

Coburn's instrument is more accurate than most tonometers because applantation can be positively determined, and as the readings are made on a mercury manometer the values are absolute and not relative. The apparatus consists of a glass tube about 6 mm. in diameter but drawn down to about 1 mm. in the centre and to about 3 or 4 mm. at one end. This is protected by a fenestrated brass sleeve, through the opening in which the constricted part of the tube can be seen, and in which a sliding marker, pointing towards the capillary tube, is placed. The wider end of the tube is covered with a thin rubber membrane while the other end is connected by a rubber tube to a mercurial manometer. From the middle of the rubber tube a lateral branch leads to a rubber ball.

The method of using is as follows:—

(1) The glass tube is filled to the lower end of the constricted part with coloured water.

(2) The diaphragm closing its end is pressed against a flat surface and the indicator moved so as to mark the top of the fluid in the tube when the diaphragm is plane.

(3) The diaphragm is applied to the eye with just sufficient force to barely dimple the surface of the ocular tissues. As the diaphragm is thus pushed inwards the fluid rises in the capillary tube.

(4) Pressure is now made on the rubber ball until the fluid returns to its original level as marked by the indicator, and then the manometric reading is taken.

The pressure as shown by the manometer indicates the ocular tension.

Corrections may be made for the elasticity of the rubber diaphragm and the weight of the water indicator, but these are very small and may be neglected when only relative results are required.

J. Jameson Evans.

J. Dunn (Richmond, Virginia). **Some Remarks on the Practical Value of the Sphygmomanometer to the Ophthalmologist.** *Archives of Ophthalmology*, November, 1908.

Dunn regards the use of the sphygmomanometer as of extreme value in the diagnosis, prognosis and treatment of certain classes of ocular disease. He gives a series of illustrative cases.

Glaucoma. Five cases are described. In two cases of absolute glaucoma the pulse tension was 200 (120 is taken as normal). In a case of acute glaucoma with chronic nephritis the pulse tension was 220. In two cases of chronic simple glaucoma it was 170 and 140. Iridectomy in the latter case checked the progress of the disease for two years.

It would seem, therefore, that, with a high pulse tension (about 200), even though no kidney change can be demonstrated, the chances of checking the disease are extremely bad, and in simple chronic glaucoma at any given stage the prognostic value of iridectomy (surgically successful) varies with the pulse tension—being better the nearer the pulse tension is to normal. In all cases of glaucoma the pulse tension should be taken after the ocular conditions have been noted, and then the urine should be examined. Operative procedures for acute or chronic glaucoma associated with high pulse tension and demonstrable nephritis are apt to be complete failures and may result in the total loss of the eye.

A high pulse tension should also make us extremely cautious in the use of mydriatics in cases where dilatation of the pupil is desirable (owing to opacities of the media, etc.) for opthalmoscopic purposes. The pulse tension also indicates the desirability or otherwise of blood-letting as a remedial measure in glaucoma.

In cases of *corneal ulcer* the sphygmomanometer, by showing a high pulse tension, suggests nephritis, the danger of atropine, the possible value of eserine, and the desirability of repeated paracentesis. In the case of slowly developing immature *cataract* the sphygmomanometer may render valuable help as to propriety of operating.

In these cases the author says, " other things being equal, the case does better the more nearly normal the blood pressure, and I allow this to weigh heavily in making up my mind whether or not to advise the extraction of a slowly developing senile cataract. . . . As a rule the higher the general blood pressure the greater are the chances that there exist within the intraocular vascular system, of old people, degenerative changes which will interfere with the absorption of any lenticular cortex left behind." This, of course, applies to mature as well as to immature cataracts.

In cases of *iritis* a high pulse tension suggests nephritic complications and indicates that bleeding would be efficacious in the relief of pain, while a normal or low manometric reading indicates the contrary.

In certain cases of *retinal hæmorrhages* the pulse tension may be an important guide, along with other general and local symptoms, in deciding as to the cause of the hæmorrhage. A comparatively low tension suggests an infectious arteritis, a higher one, vascular sclerosis, and a very high tension points to a nephritic origin.

Similarly, in cases of *inflammatory and œdematous conditions of the papilla*, the pulse tension often helps us to decide as to the probability of their origin from intracranial growth, nephritis or infective conditions.

In certain cases of *pains in the head* it will indicate their possible origin from collæmia (Haig) and explain the comparative failure of their relief by means of glasses. It also suggests an explanation of the varying refraction of the same eye at different dates of examination.

J. JAMESON EVANS.

T. AXENFELD (Freiburg). **Bacteriology of the Eye.** Translated by Angus Macnab. London: Baillière, Tindall & Cox, 1908.

IN our issue of June, 1907, we published a review of this admirable book as it appeared in its original German form. As we mentioned then was likely to take place, an authorised translation has now appeared, which renders the book accessible to all English speaking readers, and which ought to be and will be highly appreciated. Until this book appeared there was really no treatise extant upon the bacteriology of the eye, but that want has been most effectually met by the publication of the present volume.

The first chapter consists of an excellent account of the technique of the examination, staining, identification, culture, and so on, embodying the results of much patient, earnest work in the Professor's own laboratory and those of other workers. The second chapter deals with the bacteriology of the normal conjunctiva, the next with the lids. Chapter IV. discusses wound infections; V. and VI. deal with conjunctivitis in general and then with the various special varieties (gonococcal, diplobacillary, pneumococcal, and so on). The lachrymal apparatus, the cornea, leprosy, tuberculosis and syphilis, endogenous infections, and the orbit are the subjects of the succeeding sections. All this work is most thoroughly well done, and the book forms a wonderful monument of the insight, devotion, skill, and ingenuity of its author; it is simply indispensable to the clinical worker who desires to be up-to-date. It is right to add that the translator appears to have done his part well, and in its English dress the book is attractive and elegant, extending to some 400 pages. The coloured figures, which are numerous and most instructive, are admirably executed and "convincing." The references to literature are all-embracing. The letterpress is full of the most practical, clinical hints without the author wandering from his brief in the least degree. The only criticism of the least non-laudatory kind which we could conscientiously offer, namely, that if it has a fault the book is too full, is in truth rather a compliment than otherwise.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, June 10th, at 8 p.m.

Mr. W. H. H. Jessop, *Vice-President, in the Chair.*

A case operated on for Paralytic Ptosis by his Method of Resection.—Dr. A. Freeland Fergus.

The patient, on whom this operation had been performed, was shewn as an example of the method of procedure adopted by Dr. Freeland Fergus, and described by him in the last volume of the Transactions.

Dr. Eason pointed out that when the patient opened his eyes, which he did well, the occipito-frontalis did not appear to be acting, but the movement was carried out by the levator palpebrae.

Mr. A. H. Thompson also recalled the fact that the man had paralysis of several other ocular muscles at the time the case had been previously described, but that these had now recovered.

Spectroscope for testing Hue Perception—Dr. F. W. Edridge-Green.

A case of Double Iridectomy for Congenital Glaucoma by the Method of Lagrange.—Mr. Arnold Lawson.

The patient, aged 34, was first seen in December 1908. The sight in the left eye had always been weak; and lately that in the right, which up till now, had been considered sound, had been getting much worse. R.V. $^{6}/_{36}$ c. $-4{\cdot}5$ sph. $= {}^{6}/_{18}$ (2). L.V. Fingers at 2 ft. Both eyes were larger than normal, had large corneæ and deep anterior chambers. Pupils somewhat dilated and almost immobile, especially the left. $T+2$. Both discs were cupped; and the left field was reduced to a minute area about 2 degrees in diameter round the fixation point.

Having decided that an ordinary iridectomy would not be appropriate treatment in this case, Mr. Lawson performed a Lagrange's operation on the left eye on December 14th, 1908. The tension gradually diminished and the vision with correction improved to $^{6}/_{18}$ full. Eight weeks later the same operation was performed on the right eye.

Various opinions were expressed regarding the merits of Lagrange's operation. Dr. Weeks (of Philadelphia) said he had performed it 30 or 40 times, but the results had not been such as he had anticipated. By carrying out the method of Lagrange one was enabled to do a good iridectomy, healing of the wound was retarded and late cicatrisation was the result; but after three or four months the scar presented the appearance seen in an ordinary iridectomy. Dr. Weeks favoured the formation of a filtering scar by means of inclusion of a piece of iris in the wound, were it not that the risks of the operation outweighed the advantages.

Mr. Treacher Collins opposed the operation of Lagrange on theoretical grounds, and considered that the operation of cyclo-dialysis, which attempted to open up the normal channels, was founded on better principles. Incarceration of iris involved the risk of possible infection at some future date.

Dr. Odillo Maher was in the habit of making a cystoid scar by deliberately arranging for the inclusion of a portion of iris in the wound; and had lost only one case up to the present from infection.

Mr. Richardson Cross was on the whole in favour of forming a leaking scar.

An unusual form of Cataract, Bilateral, in a Girl.—Mr. J. Herbert Fisher.

A. M. S., female, aged 12, was first seen October 1907. She was the third child of five and none of the others were affected.

The vision, with correction, was $^{5}/_{12}$ partly in each eye.

Each lens shewed a circular dot of opacity at the posterior pole, and radiating from this 6 cortical striae at symmetrical intervals. The whole appearance might be called a boat-shaped or elliptical opacity lying somewhat obliquely with its long axis approaching to the vertical; the free margin is sharply cut, and the cortical striae shew open mouths and are strongly suggestive of the trumpet-shaped opacities seen in coralliform cataract, of which it may possibly be a variety.

Bilateral Ptosis and Ophthalmoplegia Externa.—Mr. W. H. H. Jessop.

Norah H., aged 5, was first seen April 28th, 1909. Photographs taken of the child in earlier life confirmed the history that the condition had only been noticed for six weeks. No history of any illness. On March 15th there was drooping of the right lid, followed by a squint on the 21st, and subsequently drooping of the left lid. The family history shewed that the maternal grandfather died of phthisis, and two daughters died at 13 and 11 months respectively of wasting disease. Both eyes shew complete paralysis of both levatores palpebræ, there is 5° of strabismus in the right and limitation of movement upwards, downwards, and inwards, while in the left the movements are defective upwards and outwards. von Pirquet's reaction gave a positive result. The case was being treated with tuberculin injections.

Dr. Batten considered that it was a case of tuberculosis affecting the corpora quadrigemina, extending backwards so as to involve the sixth and the seventh cranial nerves.

Mr. Jessop remarked that Dr. Ormerod had expressed the same view regarding the case.

Unilateral Swelling of the Eyelids, ? Tubercular.—Mr. W. M. Bergin.

Harry Y., aged 7, came with the history that $2\frac{1}{2}$ years ago a stye formed on the right upper lid and 18 months ago the right lids received a blow from the handle of a perambulator. The case was first seen in January 1909, when each eyelid was swollen but not œdematous; one piece of the lid was removed and examined but was found to be natural, the other piece was described as being of a tuberculous nature.

An unusual Elastic Adhesion between the Cornea and the Iris.—Mr. Herbert Bell.

This was considered to be congenital in origin.

Pemphigus of Conjunctiva.—Mr. Blair.

The patient applied for treatment two months ago, with an attack of apparently mucopurulent catarrh and some thickening of the palpebral conjunctiva. At the present time there is essential shrinking of the conjunctiva. The treatment adopted was arsenic and fibrolysin.

Papers.

(*a*) *A family with Congenital Displacement of the Lenses.*—Mr. P. H. Adams.

This family consisted of a mother and nine children, seven of whom were affected; all other branches of the family being quite free.

The first child, a boy, was seen in 1896 by Mr. Doyne, who noticed that the right lens was displaced downwards while the left was completely displaced. The second, a girl of 16, had her right lens displaced inwards, while the position of the left was up and in; the third, a girl, aged 14, had normal lenses. The fourth, a girl aged 12, had both lenses displaced downwards; the fifth, a girl, aged 11, had both lenses normal; the sixth, a girl aged 10, had both lenses dislocated inwards, the seventh, a boy aged 8, shewed the right lens displaced upwards, and the left upwards and outwards, the eighth, a girl aged 3, had the left lens dislocated inwards and the right downwards. The ninth child, a girl aged 17 months, had both lenses displaced upwards.

It is interesting to notice the number of displacements upwards and in some cases downwards, whereas the usual position is upwards.

A coloured drawing accompanied the paper.

(*b*) *A family with Congenital Opacities of Lenses.*—Mr. P. H. Adams.

This family shewed hereditary stellate cataract, the opacities outlining the sectors of the lens on the posterior surface, and in some cases the anterior surface though to a much less extent.

The eldest member of the family was the great-grandfather aged 83, and in him the changes in the lens seemed to progress chiefly in the anterior part, as though it had spread from the original Y-shaped mark. The father and two sisters exhibited the same defect, and the daughter's two children were both affected; the son shewed Y-shaped markings on the anterior surface of both lenses. The eldest girl shewed posterior lines very sharply marked; the second child had normal eyes, the third, a boy aged 5, shewed primary rings, and the youngest child, aged 7 months, had an inverted Y on the posterior surface of both lenses. The father, now 36, shewed posterior lines; and none of the children had perfectly transparent lenses.

Reference was made to former similar cases.

A case of Retinal Disease with Massive Exudation and Arterio-venous Communication.—Messrs. A. Hill Griffith and A. W. Ormond.

A. J., a female, aged 31, was first seen May 5th, 1906. She had been deaf since she was 9 years old. and the left eye was excised 10 years before by Dr. Hill Griffith. The vision in the right eye was $^6/_9$ with 3 D of H.M.

A coloured drawing shewed the condition of the fundus. The optic disc was indistinct at the inner margin, and the retinal vessels were very distended and tortuous. The upper part of the central retinal vein divided above the disc into a superior nasal and temporal branch, both being very dilated and tortuous; the superior temporal vein could be traced upwards and outwards and ended in a white, waxy looking mass, only the edge of which could be seen. There were one or two small patches of exudate in other places.

The left eyeball, examined pathologically, shewed total detachment of the retina.

At the back of the eyeball was a triangular elevation, whose interior was partly filled with calcareous débris; it was surrounded by a fibrous capsule with spaces in it, but no giant cells were seen; a strand of yellow lymph stretched from this triangular elevation to the back of the lens. Lantern slides were exhibited illustrating these points.

A. J.'s sister, aged 15, had lost the sight of the left eye 6 months ago. There was no P.L., and the tension was +3; and an almost total detachment of the retina was seen.

The eye was enucleated, and the choroid at the temporal side of the disc was found to be thickened and engorged with blood. Embedded in its substance were several plates of young bone, continuous with the fusiform swelling formed by the detachment. The clinical picture was similar to that of the cases described in group 3 of Mr. Coats' recent paper in the R.L.O.H. Reports.

Mr. Ormond suggested that these cases of choroido-retinal exudate might be explained by saying that we are dealing with a general disease of the terminal branches of the retinal vessels.

An Epithelial Filament in the Anterior Chamber simulating a Thread-worm.—Dr. George Mackay.

A little girl, aged 7, had always enjoyed good health, had no special illness, had never suffered from worms, nor had she complained much about her eye. The vision in the Right eye was $^6/_{12}$, in the left $^6/_6$.

The filament had first been noticed when she was eight months old, and no independent movement had ever been detected in it, but the parents were under the impression that it was slowly increasing in size. There was occasional irritability and a trace of ciliary injection. At the periphery of the iris, close to the angle of the anterior chamber, between the 5 and 6 o'clock meridians, a buffy grey filament about 1 mm. in diameter, emerged from between the fibres of the iris, ascended in close relation with the posterior aspect of the cornea for 3 or 4 mm., then bent backwards towards the lower border of the pupil, and crossing the vertical meridian of the anterior chamber, appeared to rest lightly in contact with the sphincter surface of the iris. Thereafter it bent downwards once more, following the plane of the iris nearly in the 7 o'clock meridian. The structure terminated in a slightly bulbous free extremity which did not re-enter the iris nor extend to the angle of the anterior chamber. The arched filament had thus a slight spiral twist.

The filament was removed and subjected to pathological examination, when it was found that the structure was mainly composed of stratified epithelium with a little loose connective tisue.

Mr. Parsons thought that the filament might be of endothelial origin.

The Report of the International Committee on the Unification of the Notation of Visual Acuity and the Meridians of Astigmatism.—Mr. W. H. H. Jessop.

The conclusions arrived at were as follows:—(1) The meridians of astigmatism should be measured and represented as the observer looked at the patient: (2) the axes should be measured and represented in the upper semi-circle of the trial frame. The numbering of the axes should start from the middle line of the face in each eye, and proceed upwards and temporalwards. The zero would therefore lie at the nasal end of the semi-circle and 180° at the temporal. The committee also agreed that, for international test types, numbers should be used. Landolt's ring was also thought to be a suitable object. The unit of measure should be an angle of 1 minute; the types were to be constructed as regards size in arithmetical progression, and the standard distance at which they were to be seen should be 5 metres. The source of light should be diffuse daylight, arranged if possible opposite the types and not laterally.

MALCOLM L. HEPBURN.

CORRESPONDENCE.

To the Editor, "Ophthalmic Review."

NOTTINGHAM, *June*, 1909.

SIR,—In the current number of the *Ophthalmic Review* Dr. Hugh Thompson, in introducing his interesting series of cases of primary glaucoma in young people, states that no current theory, including my own, attempts to explain the occurrence of glaucoma in patients not yet middle-aged. In various papers on the pathogenesis of glaucoma I have brought out the following points bearing on this question, which apparently Dr. Thompson did not appreciate when referring to my work:—

(1) Sclerosis of the cribriform, so-called pectinate, ligament is a physiological process, increasing with age, and predisposing to glaucoma by tending to raise an obstruction to the access of aqueous to Schlemm's canal.

(2) Glaucoma follows as the result of a pathological excess of this physiological sclerosis.

(3) The same agents that induce sclerotic changes in the tissues of the body generally will in the case of the cribriform ligament bring about this pathological excess and thus lead to primary glacoma quite irrespective of age.

(4) Early sclerosis of the cribriform ligament will lead to early glaucoma, and in the infantile eye buphthalmos.

I am, etc.,

THOMSON HENDERSON.

A CASE OF EXTREME HYPERMETROPIA.

By N. Bishop Harman, M.A., M.B. (Cantab.), F.R.C.S. (Eng.), *Assistant Ophthalmic Surgeon to the West London Hospital.*

Hypermetropia exceeding 10 dioptres is of sufficiently rare occurrence to warrant the description of a case in which the error of refraction of the eyes nearly doubled this common high-water mark.

The case under review came under my care at the Belgrave Hospital for Children a year ago; I have seen the boy on several occasions since then, and he is now being trained at one of the London County Council Blind Schools.

Family History.

Father, æt. 42, healthy, cab-driver, has recently passed the examination of a large motor-cab company, and now drives a 'taxi.' I have not seen him, but there seems no doubt his eyes are normal; he passed his company's tests.

Mother, æt. 47, healthy woman; eyes normal, V.=$^6/_6$, No Hm., Pr. 1D=Jg. 1. The woman had eight pregnancies, with results as follows:—

1. Girl, now æt. 20, dressmaker; well-developed; beautiful teeth. Eyes: R. V.=$^6/_6$, no Hm., L. V.=$^6/_6$, Hm. 1D, fundus normal.

2. Girl, æt. 18, dressmaker; slightly under average physique; teeth defective, pitted enamel. Eyes: R. and L. 4D myopia, V. with glasses $^6/_6$.

3. Boy, æt. 17, office boy; "has good vision, passed the school tests before leaving."

4. Girl, æt. 16, under-sized, rabbit-faced, unhealthy-looking; high-arched, narrow U-shaped palate; teeth defective, pitted enamel, very carious; mentally defective, a great trouble to her mother. Eyes: V.=$^6/_6$, Hm. 0·5D,

fundus normal. The child was delivered prematurely at $7\frac{1}{2}$ months.

5. Harry, æt. 12, the boy to be described further.

6, 7 and 8 were miscarriages at the third month of pregnancy.

There is evidence of a progressive deterioration of the results of conception; there was no evidence of syphilis.

DESCRIPTION OF THE CASE.

Harry T - - - - - r, aged 12 years. Under-sized, rabbit-faced, of fair intelligence—not mentally defective; teeth very carious, but no pitted enamel; right ear fœtid discharge following adenoids, slightly deaf.

Head measurements (no allowance for scalp): Circumference 51 cm., sagittal curve from glabella to occipital protuberance 34 cm., both rather under average. The cephalic index works out thus: antero-posterior diameter 18 cm., transverse diameter 15 cm., $\frac{\text{breadth} \times 100}{\text{length}} = 83{\cdot}3$, *i.e.*, the head is brachycephalic to a degree not common in England.

Eyes. It will be well to give the refraction first, for the state of the globe and its parts, the muscles and the subjective value of the vision will be of more interest when the refraction is before one.

Retinoscopy at the distance of 1 metre, keeping the reflexes just within the limit of hypermetropia, gave the following: Vertical meridian 19·5D, horizontal 20D; corrected for infinity the refraction would be +18·5D c. +0·5D cylinder axis 80° down-in. The refraction was the same for each eye, and the same value could be obtained both with and without the use of a mydriatic.

The anatomical condition of the eyes now becomes of interest. The lids were perfect in shape, the lashes, glands, tear ducts and the conjunctivæ were all normal.

The globes when the lids were retracted appeared notably small. The corneæ looked normal by front view, well shaped, clear and bright; viewed laterally they were sharply curved.

Measurements. The corneal diameter was taken with Priestley Smith's keratometer. The radius and dioptric value of the anterior surface of the cornea with Chambers-Inskip ophthalmometer. Globe axes with calipers.

	Corneal diameter	Corneal radius	Corneal dioptric value	Globe vertical axis	Globe ant-post axis
Harry T....	11 mm.	6·9	50·75D	16 mm.	about 19mm. including tissues
Average ...	11·6 (Priestley Smith)	8·0 (Donders)	43 (Donders)		23·8 including sclera (Helmholtz)

The anterior chambers were of about average depth. The irides normal, of a yellowish-brown tint on a greenish background. The pupils reacted well to light, directly and consensually, and with convergence. The irides were quite steady, and had a proper forward curve showing that the lenses were in position. The pupils dilated well to homatropine, and the presence of Purkinjie-Sanson images could be made out. Vitreous clear, no appearance of central canal or hyaloid vessels. Fundus, colour good, optic discs tumid, and coarsely striated as though the nerve fibres were partly opaque; the vessels were of normal calibre, but they were extremely tortuous in their course.

Examination of Vision.

When the boy stood to attention both eyes appeared to fix well, there was no suggestion of squint or of nystagmus. He could count fingers at a metre, recognise all the common objects about him, and distinguish letters when held close to his eyes. The concomitant muscle movements were perfect in all directions, without any nystagmus. There was an extreme range of convergence; he could fix a point held 5·5 cm. from the level of the cornea, *i.e.*, a convergence of about 18 metre-angles.

Tested with glasses his vision could be improved considerably, with +18D he got $^6/_{36}$ in each eye; but these lenses could not be used for long on account of the length of the eyelashes. The lenses ordered were +15D, of the diameter of a shilling piece, so that they might be as thin and as light as possible; these glasses are very satisfactory, he now gets $^6/_{24}$ both eyes.

Accommodation. It will be obvious that any exercise of this power would be out of the question with such an extreme error of refraction. Yet in doing retinoscopy without a mydriatic it was possible to determine that the boy had the power to vary his refraction by 2 to 3 dioptres.

That the boy had good binocular fixation I proved by the use of the Diaphragm Test. A test card with three spots upon it (Fig. 1), arranged so that the middle spot should be seen with both eyes, the right spot by the left eye, and the left spot by the right eye, was used.

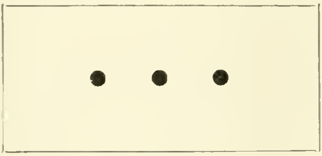

Fig. 1.

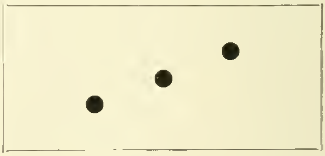

Fig. 2.

With his glasses on the boy looked through the hole in the diaphragm and saw three spots; after a time he said there were only two. It was evident that at first he had perfect binocular fixation even under the reduced stimulus of the test; he later either converged, or suppressed the vision of one eye. That there was no suppression of vision was shown by varying the position of the spots (Fig. 2).

On looking at this card he at first saw three spots, and later on four, for the middle spot was reduplicated on convergence, and could not be fused with the lateral spots.

THE DIOPTRICS OF THE EYE.

It is not necessary to go into any elaborate mathematical calculation, a simple comparison of the known data of the eye with those of the average eye will bring out satisfactorily the probable condition of the unknown factors of this case.

The anterior surface of the normal eye has a dioptric value of 43D, and supposing there were no lens the eye would have to be 31 mm. long to focus for infinity; with the crystalline lens in position (*i.e.*, a lens of the value of 22D in air) the eye focusses at 22·4 mm., which is the length of the axis of the normal eye from the front of the cornea to the fovea. If in such an eye the lens be removed the eye becomes hypermetropic to about 13D at the cornea—we commonly order 10 or 11D on account of the distance the lens has to be worn from the eye.

In the eye of H.T., the cornea has a dioptric value of 50·75D for the anterior surface, so the eye would focus without a lens if it had an internal axis of 26 mm.; with a normal lens of the value of 22D in position the eye would focus at 16·6 mm. The eye, however, probably has an axis of no more than 14 mm.,* and so would require a correction placed in front of the eye of 8D. But it wants 18D, as found by retinoscopy, there are therefore 10D to be accounted for. The eye must be either much shorter than was estimated by the calipers, say not more than 11 mm. long, which is scarcely likely; or, suppose the estimated measurement be nearly correct, the crystalline lens must be of much smaller value than normal, say not more than 12D, that is, the lens is very flat.

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* The external measurement was 19 mm., deducting 5 mm. for the conjunctiva, muscles, fat, sclera and choroid, the internal measurement would be 14 mm.

In the days before Donders finally demonstrated the cause of hypermetropia, various conditions were put forward as explanations. Donders [1] writes: "*A priori* it might be supposed, and it has been not only supposed, but also asserted, that less convexity of the cornea and of the crystalline lens is peculiar to the hypermetropic eye. So far as the cornea is concerned, I am justified by the results of numerous accurate determinations, in denying the assertion. . . . In the highest degrees of hypermetropia, I have found the radius even less than normal. . . . Whether a flatter crystalline lens belongs to the hypermetropic structure of the eye, is quite unknown. . . . I have endeavoured to measure the length of the visual axis of superficially-situated hypermetropic eyes, turned strongly inwards, and thence, in connection with the simultaneously determined radius of the cornea and the degree of hypermetropia, to calculate the focal distance of the lens. But the measurement of the visual axis appeared to be not sufficiently accurate."

As I have indicated in the opening sentence, such cases are not common. No case of such a degree appears in Donders' work; Seabrook [2] published one of 24D; Work Dodd [3] saw a man of 38 years with 15D, whose son had 14D; Chavasse [4] has collected a dozen cases in a fairly recent paper; and Lafon [5] has just recorded a case in which the right eye had 14D and the left 15·5D. The rarity of the condition can best be gauged by the statement of Leber [6] that amongst 80,000 patients he found only four cases of hypermetropia exceeding 10D; further, I have recently published [7] the results of the examination of the refraction of 1,100 London school children of ages from 6 to 13 years, all of whom were referred for 'defective vision': there was amongst them only one with hypermetropia of or exceeding 10D, and that is the boy whose eyes have been described.

1. Donders. "Accommodation and Refraction of the Eye" (Sydenham Soc.), 1864, p. 246.
2. Seabrook. *New York Med. Journ.*, 1889.
3. Work Dodd. *Trans. Ophth. Soc. U. K.*, xxi, p. 171.
4. Chavasse. XXV. réunion d. l. Soc. franç. d'Opht., 1906. *Bull. et Mém.*, p. 184—190.
5. Lafon. *Rec. d'Opht.*, Jan., 1909, p. 19.
6. Leber. XXIII. réunion d. l. Soc. d'Opht. d. Heidelberg, 1906. *Comptes Rendus*, p. 203.
7. Harman. *Proc. Roy. Soc. Med.* (*Sect. of Children's Diseases*), 1909, p. 206.

REVIEWS.

STRAUB (Amsterdam). **On the Ætiology of Anomalies in Refraction, and on the Origin of Emmetropia.** *v. Graefe's Archiv*, 70, 1.

THIS paper embodies the results of various researches, not only of the Amsterdam professor himself, but of various of his pupils. The connecting link between them is found in the professor's theory of the normal development of the human eye, or, as he terms it, of the origin of emmetropia. Shortly stated, it is as follows: The axial length of the normal emmetropic eyeball is anything between 22 and 25 mm. This variation is so considerable that there must be some compensatory influence at work, an influence which, it is maintained, is actually exerted by the unconscious efforts of the organism to attain to the ideal of clear distant vision. These efforts become effective through the agency of the nervous system by the action of the ciliary muscle, the fibres of which during infancy are adjusted to such a length, as, allowing for a condition of normal tonic contraction, will cause a curvature of the lens sufficient to focus parallel rays on to the retina. Its action is all along being antagonised, not by another muscle, but by the normal intraocular pressure, which is constantly tending to make the eyeball into a perfect globe whereas the traction of the ciliary muscle tends to cause an indentation at the sclero-corneal junction. In this way, during the process of growth, the ultimate shape of the normal eyeball is determined by the psychological need of the organism acting through the nervous system and using the ciliary muscle as its tool. It is necessary to grasp this theory as all the results of the researches which follow are considered in their relation to it.

First, as to emmetropia. Falkenburg, one of Straub's pupils, took 59 normal emmetropic eyes belonging to individuals all aged 20. After paralyzing the accommodation with atropin, the majority of them showed various degrees of hypermetropia, generally between 1 D and 1·5 D. Six of them, however, remained emmetropic, a circumstance which is attributed to the relaxation of tone in the ciliary muscle in eyes which were on the way to become myopic but which were kept emmetropic by the adjusting mechanism already alluded to. The probability of this explanation being correct is strengthened by a chart showing the relative length of the radii of the anterior surface of the lens in three sets of 21 eyes each, the first being all myopic, the second all emmetropic, and the third all hypermetropic (presumably all under atropin, but this is not stated). The length of the radius in the myopic eyes is on the average 1½ or 2 mm. greater than in the hypermetropic eyes, that of the emmetropic ones being intermediate, showing a tendency on the part of the lens to compensate for the elongation of the globe which is the cause of myopia. Taking this finding in conjunction with the one previously mentioned on atropinised emmetropes, the conclusion appears justified that the compensation is effected by means of a permanent adjustment of the fibres of the ciliary muscle.

The age at which the tonic contraction of the ciliary muscle begins to give way is very variable and several pages of statistics are devoted to proving this. A number of presbyopes were examined periodically and their refraction recorded during a period of 25 years. Eight persons who at the age of 40 were practically emmetropic (all under + 0·5 D) showed an average hypermetropia of + 2·47 D at the age of 65. On the other hand 18 persons who at the age of 40 were hypermetropic + 1·0 D, at the age of 65 showed an average hypermetropia rather less than the first group, namely +2·37 D. Again, among emmetropes and hypermetropes under 40, a certain proportion are found by testing before and after atropinisation to have no tonic contraction even at that age.

The next section deals with myopia. A recent critic of ophthalmological methods has attacked the "hot-bed theory of myopia,"* that, namely, which attributes its prevalence very largely to the direct influence of sedentary work in the schools. This paper, however, affords further support to the generally received opinion which was first formulated by Cohn (1867) and reinforced by Tscherning (1883), who found that among a number of people 20 years old, the percentage of myopia increased directly as the number of years during which those examined had attended school. Following on the same lines, one of the Amsterdam investigators (Dinger) has examined upwards of 10,000 school children by retinoscopy. They were drawn from four different classes of public schools, the fees in the first class being only 3 gulden per annum, in the second 6 to 10 gulden, in the third 15 to 50, and in the fourth 75 gulden per annum. Comparing only children of the same age drawn from these different classes of schools he finds that with one reservation, the rapidity of increase in the percentage of myopia with age is in direct proportion to the money spent in school fees. The reservation applies to children under seven among whom myopia is commoner in the very poor than among the well to do. This exception, however, may be said to confirm the rule, because the myopia which is found in children under seven is generally due to congenital causes. With these children the influence of school life is but a minor one and indeed their myopia is often well advanced before they arrive at school age.

Further points dealt with in the section on myopia are its connection with corneal nebulae, the decrease of visual acuity with the increase of myopia, the proportion of cases of detached retina in the various grades of myopia and the connection between myopia and astigmatism. With regard to the relation of ordinary school myopia to the more serious cases of high myopia, the view of Priestley Smith and others is held, that the difference is not one of kind but of degree. In all cases of myopia predisposition must play an important part, but in all cases, too, exciting causes such as corneal nebulae, low visual acuity, excessive use of the eyes in near work, and astigmatism, have their share. In the mild cases the influence of exciting causes is more easily traced. In the more severe ones the predisposition is so strong that the exciting causes fall altogether into the background.

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* Prof. Karl Pearson, v. *Ophthalmic Review* for May, p. 134.

Perhaps the most interesting of the charts dealing with myopia are those showing the influence of full correction on cases continuously observed during a number of years compared with the influence of partial correction on another series of cases. The comparison is greatly in favour of the method of full correction, but the following points come out. Before the age of 14 myopia is usually progressive even in cases wearing fully correcting glasses. After the age of 14 the proportion of those who became stationary is far greater among the fully corrected than among the partially corrected. On the other hand, taking the more serious cases alone which progress after the age of 14, it cannot be shown that full correction has any important influence in preventing their progress. In fact the figures so far as they go seem to show that full correction either succeeds in completely arresting progress of myopia about the age of 14 or else fails even to hinder it. The author attempts to explain this by his theory of emmetropia. When a myopic eye is allowed to renounce all efforts to see clearly at a distance there may be no influence strong enough to counteract the causes which tend to the increase of myopia. When, however, by the aid of a glass the eye is made emmetropic, the psychic factor becomes once more important and may prove an effective check to the increase of myopia. The old theory that ordinary use of the ciliary muscle was dangerous for myopes has now been quite abandoned. Straub goes further, and argues that its maintenance in good working order with a sufficient tonic action, is an actual safeguard against the growth of myopia.

Hypermetropia is treated mainly from the point of view of its causal connection with certain other conditions which often accompany it, namely, subnormal visual acuity in both eyes, subnormal visual acuity in one eye, anisometropia and squint. The greatest interest attaches to the existence of monocular amblyopia without anisometropia and without squint. Worth denies that such cases exist.* Straub maintains that they do, but since the proof must necessarily depend on the reliability of mothers' evidence as to the behaviour of their children's eyes during infancy, it is not likely to be very convincing. The theory of Straub is that in many individuals there is a congenital weakness in the visual power of one eye compared with that of the other, a weakness which may or may not go as far as the lack of fusion power, with the idea of which Worth has familiarised us, but which nevertheless is sufficient to make the power of binocular vision weak and unstable, so that any acquired injury to the visual power of the weak eye may easily cause a squint. It is only in exceptional cases that the theory of amblyopia ex anopsia can be proved to hold good. In most cases of amblyopia the defect is congenital. This way of putting it seems to ignore the fact that in the first few months of life we are all more or less amblyopic and the evidence adduced by Worth in his chapter on amblyopia. Some interesting observations, however, are recorded in this connection, of which the following is an example. A young hypermetrope of + 4·0 D in each eye, with his right eye could see $^6/_6$ either without a glass or with a glass of + 3·0 D. With his left eye he required a + 4·0 D glass before he could see $^6/_6$ at all. His binocular vision was good. In this case the value of the retinal image in the left eye was for some reason inferior to that in the right eye in calling forth the effort to accommodate.

Finally some statistics dealing with the evolution of astigmatism are given. These are in accordance with some published by the reviewer † in showing that hypermetropic tends to transform itself into myopic astigmatism during school life, a tendency towards myopia far more active than exists in the non-astigmatic child. It is curious, however, to note how small a proportion the Amsterdam statistics show in the intermediate stage of mixed astigmatism. It is difficult to account for this, and it is not in accordance with the statistics just referred to, but the point is emphasised by Straub who offers what appears to be a rather far-fetched explanation derived from his theory of emmetropia.

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* *v.* Worth on "Squint," chapter v.

† *British Medical Journal*, 1906.

While it is easy in such a paper to discover points of criticism or disagreement, readers of it will find much to stimulate thought in a region which is apt to be considered barren as far as scientific interest is concerned, however important from a more mundane point of view.

A. H. T.

HOPNER. **Late results of Operations for Myopia performed in the Leipzig Clinic from 1893 to 1906, with special reference to Post-operative Detachments.** *Von Graefe's Archiv für Ophthalmologie*, 70, 1.

IMAI. **Results of Myopia Operations.** *Beiträge für Augenheilkunde*, March, 1909.

THE former of these papers gives a tabular statement of the results of Sattler's operations for myopia at Leipzig, comprising details of 242 patients, 338 eyes having been operated on. The other paper gives a digest of the operations of Vossius at Giessen between 1895 and 1906 on 60 myopic eyes (46 patients). The earlier cases from Leipzig have been previously published in 1897 by Otto and in 1902 by Voigt, but since the value of evidence on this subject depends to a great extent on the time during which the cases have remained under observation, Höpner has done well to bring this important mass of material as far as possible up to date. Nearly half of the total number of cases, comprising all the earlier ones, were dealt with by the method of Fukala, *i.e.*, primary discission, followed by evacuation of the swollen lens matter some days later. The rest of the cases, the later ones, were dealt with by the method suggested by Hess (who himself no longer operates on high myopes) and put into practice by Sattler, viz., primary linear extraction. In the comparison between the results of the two methods of operating Höpner's statistics appear to tell in favour of linear extraction, but they do not carry much weight with the open minded reader in this connection for the following reasons: (1) The fact that it was the more recent cases that were treated by linear extraction makes the results in these cases less "ultimate" than those of the cases treated by needling. (2) A certain number of cases both in the earlier and later period were in patients over 30, and for these most would admit that linear extraction is the more suitable method. Taking younger patients Höpner's figures are not so much in favour of the method, and taking patients between 10 and 20,—the commonest and most suitable age for operation—the figures show a practical equality in the results of the two methods. (3) Every operator is likely to get better results from the method that he has made his own than from any other. In a comparison between the two methods in the second paper under review the verdict derived from the experience of Vossius is in favour of the older method of Fukala.

As regards the risks of the operation, it is well known that some surgeons have abandoned it after many years experience. It must also be confessed that the results set forth in these latest contributions to the subject are not of a very encouraging nature. Thus in Höpner's statistics, the vision of 74 out of 338 eyes was worse after operation than it had been before. As in the case of 75 out of the total the period of observation was less than one year, the proportion who received permanent benefit was probably considerably under three quarters. In the 60 eyes operated by Vossius and examined some years later in only 32 could it be said that a permanent improvement had resulted. We must of course remember that if these highly myopic eyes had not been operated on a large majority of them would have tended to get worse. It is necessary to consider the causes of failure after operation more in detail. They are thus set down:—

Vitreous opacities:	Leipzig clinic	8	Giessen clinic	—
Choroidal Atrophy	,,	12	,,	1
Hæmorrhages	,,	5	,,	1
Secondary cataract	,,	8	,,	6
Glaucoma	,,	2	,,	3
Infection	,,	2	,,	1
Detachment of the Retina	,,	33	,,	11

Now of these causes of failure the first three are incident to the disease itself. There is neither proof nor reasonable presumption that operative treatment has any effect either in causing or preventing them. Of the second three on the other hand, we may say that they are directly attributable to the operation itself, and here the individuality of the operator must be of importance. The larger proportion of secondary cataracts,—6 out of 60 at Giessen,—may be compared with the smaller proportion, 8 out of 338, at Leipzig. The last cause —detachment of retina—is by far the most important cause of failure, and here we have a large number of cases, many of which belong rightly to the first group—*i.e.*, failures incident to the disease and not to the operation, but some of which should probably be rightly placed among the second group. How numerous these latter cases are is the main question now at issue between those who oppose the operation for high myopia and those who continue to practice it. Operative failures due to other causes may probably be minimized by proper selection of cases and the increase of experience in the operator, but if the operation is proved very materially to increase the risk of detachment of retina it will be difficult to justify it, however great the benefit to the more fortunate cases may be.

Höpner finds that out of 1,330 myopes of at least −14 D seen at the Leipzig clinic 101 had a detachment, *i.e.*, 7·7 per cent., or, including cases not certainly diagnosable, 9·96 per cent. These figures do not seem comparable with the 33 detachments out of 338 eyes operated on, many of which were only followed up for short periods, and if the comparison is made the ratio in the second case would have to be, not 33 : 338 as Höpner suggests, but 33 : 242, the latter being the number of patients operated on. A more satisfactory basis of comparison is Hippel's. He examined a number of patients on whom he had operated monocularly some years before; among them he found 9 in whom a detachment had taken place in the operated eye against 7 in whom it had taken place in the non-operated eye. Höpner, however, declines to institute a comparison on this basis on the ground that since the more highly myopic eye was generally chosen for operation at Leipzig the chances of detachment were necessarily greater than for the non-operated eye. In 12 patients over 40, however, operated on by peripheral extraction of the lens in one eye, detachment occurred in the operated eye in 3, in the non-operated eye also in 3. The authors of both papers under review, in common with previous writers, claim in regard to all detachments occurring after the expiration of one year from the last operative procedure, that these cannot in any fairness be attributed to the operation. If this be granted, and we compare the number of detachments discovered during the first year with the number discovered during the second or subsequent years the preponderance of detachments in the first year both at Leipzig and Giessen is greater than can be accounted for by the fact that so many patients were lost sight of at early periods. Imai gives the exact intervals after the primary operation at which the Giessen cases of detachment occurred and they are very instructive:—

After	11	years	11	months	1	case.
,,	10	,,			1	,,
,,	9	,,	8	,,	1	,,
,,	8	,,	8	,,	1	,,
,,	6	,,	6	,,	1	,,
,,	5	,,	1	,,	1	,,
,,	1	,,	3	,,	1	,,
,,	0	,,	5	,,	2	,,
,,	0	,,	4½	,,	1	,,
,,	0	,,	3½	,,	1	,,

He also gives Hippel's figures which show 7 detachments to have occurred during the first year, while in no subsequent year did any more than 4 occur.

In the Leipzig figures on comparing the number of detachments found during any year with the number of eyes which remained under observation during that year we find that in the first year 7 detachments out of 338 represents a proportion 1:48. In the second year 3 out of 263 under observation represents a proportion of 1:87, which is about the average for subsequent years.

We may take it then that there is a considerable mass of evidence, though by no means of an exact character, that the operation does predispose to detachment during the first year. How far can this fact be neutralized by a proper selection of cases or by other means? In 6 out of the 11 cases of detachment at Giessen there were vitreous opacities present before the operation, and we may agree with Imai who considers that vitreous opacities and advanced choroiditis should be contraindications to the operation. Not only do these conditions tend to deteriorate the vision in themselves and so help to bring the operation into disrepute, but they are probably specially associated with the danger of detached retina Höpner advises that if there is any indication of a threatening detachment in one eye, that should be a contra-indication to operation on its fellow, as he finds that the proportion of cases in which double detachment occurs is higher among high myopes than among other patients with detachment. With regard to the operation itself, the details of many of the cases of detachment summarised in these papers tends to show that it is specially liable to follow a loss of vitreous. This is where the importance of a suitable operative method comes in. If in this notice the risks rather than the advantages of the operation have been emphasized it is not because the reviewer fails to recognize the great benefit it has conferred in favourable cases. But in order that these benefits may not be sacrificed and the operation fall into disrepute, it is essential that it should not be recklessly undertaken in every case of high myopia where the patient is willing to undergo it. It may be doubted whether it should ever be performed on patients over 30 except in cases of cataract. If there are hæmorrhages, advanced choroiditis or vitreous opacities, the risks are very great. If the fellow eye is normal or only slightly myopic the advantage to be derived from operation is questionable. If it has already been operated on with success it is doubtful whether it is worth while to operate on the second. Höpner recommends it in such cases after the expiration of a year in the interests of binocular vision, but that is not a sufficient advantage to put against any definite risk. If the fellow eye has been operated on without success the risks of failure must be decisive against operating. There were two cases at Leipzig in which operation on both eyes was followed by detachment in both. If, on the other hand, favourable cases alone are selected for operation, with a degree of myopia between -16 and -24, it will certainly enable many patients to earn their own living who would otherwise have to lead dependent lives. The operated eyes, however, although they may dispense with glasses, must never be regarded as normal ones; they must be recognized to be subject to the same risks as if they had not been operated on, for neither of the writers reviewed nor any other recent authority agrees with Gelpke, who, writing in 1904,* claimed that the operation had a distinctly favourable effect on fundus disease and tended to stop the growth of the long axis of the eyes.

A. H. T.

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* v. *Ophthalmic Review* for 1904, p. 162.

M. Meyerhof (Cairo). **The Etiology of Membranous Conjunctivitis in Egypt.** *Revue Générale d'Ophtalmologie,* March, 1909.

During a period of five years, the author of this interesting paper examined bacteriologically over 1,500 cases of acute ophthalmia. Among this number were 110 cases of conjunctivitis in which the formation of a membrane was noted; it is with these that the present communication deals.

Meyerhof divides the 110 cases into three groups according to the severity of the attack, without reference to the causative agent.

(1) Mild or catarrhal form, characterised by the absence of severe inflammatory signs and by the ease with which the pellicle can be detached.

(2) Severe, or purulent form, in which there is œdema of lids, rise of temperature, and a very adherent pellicle on the conjunctiva.

(3) Diphtherial form, always severe and usually complicated by corneal lesions.

It is necessary to note that the author employs the term diphtheria in a purely *clinical* sense. In his 110 cases he tabulates 11 cases as diphtherial, but in only 3 of these was the bacillus of Loeffler present. Moreover in two cases which he places in the second (purulent) group, Loeffler's bacillus was the active micro-organism.

The majority of the 110 cases belonged to the indigent population; 52 males, 58 females. There were only 12 adults; and of the 98 children, the greater number were under five years of age. In most instances, both eyes were simultaneously attacked. Occasionally the disease in one eye assumed a membranous character, while in the other it was catarrhal or purulent.

A very marked seasonal variation was noted. During the winter months, from December to the end of March, the number of cases was very small. From April to June the number increased rapidly, fell again in July and August, and rose in October to the same height as in June.

Bacteriological examination of the 110 cases showed the presence in the secretion and in the false membrane of the following microbes:—

Koch-Weeks' bacillus	61	cases.
Neisser's gonococcus	32	,,
Streptococcus pyogenes	7	,,
Loeffler bacillus	5	,,

In 5 cases, of which 2 were "diphtheritic," no micro-organisms were discovered.

In 15 cases more than one of the above microbes were found in the membranous exudation, or the co-existence of the staphylococcus aureus or the pneumococcus was revealed; but in no instance was either of the two last named cocci found alone, and in no case was the diplo-bacillus of Morax, or the influenza bacillus discovered.

The relation of the three clinical forms of these diseases to the four varieties of micro-organisms mentioned above is best shown in tabular form:—

	Type of disease.			
	Catarrhal.	Purulent.	Diphth.	Total.
Koch-Weeks'	6	53	2	61
Gonococcus	2	28	2	32
Streptococcus	—	5	2	7
Bacillus of Loeffler	—	2	3	5
No microbes	2	1	2	5
	10	89	11	110

It would appear from Meyerhof's results that each of the three described forms of membranous conjunctivitis, and notably the diphtherial form, may be produced by any one of the four micro-organisms in the above list. The author holds that the difference between the variety he terms diphtherial, and the other forms is, clinically and anatomically, essentially one of degree of severity and liability to dangerous complications, such as corneal ulceration and sloughing.

In 40 of the cases corneal lesions varying from superficial infiltrations to total necrosis were present when the patients came under observation; in 3 others the cornea became affected during treatment.

In a large percentage of the cases the membranous conjunctivitis occurred in patients the subject of trachoma; this fact may be of importance in relation to the character of the attacks, especially in instances of a clinically diphtheritic type of disease, excited by microbes other than Loeffler's bacillus.

In reference to the treatment of membranous conjunctivitis, it is noteworthy that, apart from serum treatment in diphtheria Meyerhof relies chiefly on applications of silver, using a 2% solution of the nitrate, as well as the more modern preparations.

The dread of silver salts in membranous forms of conjunctivitis is, in his experience, baseless.

J. B. L.

A. Trousseau. **Chronic Conjunctivitis after Removal of the Lachrymal Gland.** *Annales d'Oculistique*, Feb., 1909.

The author finds that a conjunctivitis more or less prolonged is a frequent sequel of this operation. In most cases this is quite unimportant, but every now and again much more serious cases are seen, in which the conjunctival secretion becomes purulent some 15 to 20 days after operation, and in which no known remedy seems to have a curative effect.

Trousseau records three of these latter cases which have come under his own observation. I. A girl, æt. 17. Palpebral portion of lachrymal gland removed with careful aseptic precautions, April, 1890, on account of intractable epiphora. Fifteen days later conjunctival secretion markedly increased, and of a greyish-yellow colour. Antiseptic lotions appeared rather to augment than to diminish the discharge, and at the end of May the use of zinc sulphate solution caused great swelling of lids, and the discharge became greenish-yellow and purulent. The condition by July had subsided to a persistent chronic catarrh with occasional acute attacks. The possibility of the disease being due to inoculation was considered, as leucorrhœa was present, and a few gonococci were seen in the conjunctival secretion during the acute attacks. All known remedies were applied without result. The conjunctivitis lasted three years, and even after this the lids were occasionally gummed in the mornings.

II. A woman, æt. 27. Orbital gland removed 6 months previously after unsuccessful removal of palpebral portion. Free secretion present since operation. No bacteriological examination made. Washing with permanganate improved the condition temporarily, but it recurred, and when the patient was last heard of, 18 months after the operation, it was so bad that she could not leave the house.

III. A boy, æt. 15. Removal of palpebral portion of lachrymal gland April 1908. Twenty days later the lids became swollen, and there was a free yellowish discharge, which could not be controlled by ordinary remedies. In this case, at a later stage, there was free lachrymation on exposure to wind or cold. Bacteriological examination negative. The general health was good in the last two cases.

Trousseau suggests that the tears normally have a bactericidal action, and that this protection is taken away when the lachrymal gland is removed. In case iii, however, lachrymation was present after the operation, and an examination of the secretion revealed no change from the normal. All operations on the lachrymal gland are not followed by conjunctivitis, and it is supposed that these symptoms only follow *complete* removal. The possibility of the section of important nerves during the operation is also alluded to.

E. HARRIES-JONES.

BROWN PUSEY (Chicago). **Conjunctivitis associated with Bacillus Pyocyaneus in an Adult; Bacillus Pyocyaneus found in a Normal Conjunctival Sac.** *Archives of Ophthalmology*, November, 1908.

THE cases of conjunctivitis hitherto recorded as due to Bacillus pyocyaneus—and there are only five apparently—have occurred in new-born children. Pusey has found the bacillus in the conjunctival sac of two adults.

Case I. A male student, twenty years of age, showed some diffuse swelling and redness of the palpebral conjunctiva, enlargement of the follicles in the fornices and congestion of the lower half of the bulbar conjunctiva. There was hardly any discharge, but subjectively the eyes were very irritable at times. Smears from the lower fornix showed many epithelial cells in a fibrinous material, a few polymorphonuclear leucocytes and an occasional Gram-negative bacillus.

A twenty-four hours' culture on Löeffler's blood serum showed some large colonies which proved to be B. pyocyaneus and a few small colonies which were staphylococcus albus. The bacillus was slender, nonspore-forming, Gram-negative, and actively mobile.

On agar it formed large colonies which were white at first but in two or three days became yellowish-green, and the medium itself became coloured—first greenish and later dark blue-green. Löeffler's blood serum and gelatine were liquefied and discoloured.

There was an abundant growth in glucose, which became lemon-green in colour after several days. Milk was coagulated and acidified and later became liquefied and yellowish in colour. There was an abundant chocolate-brown growth on potato and on Heinemann's synthetic "potato" medium the growth was prolific, and the medium rapidly became green throughout. Bouillon gave a growth in twenty-four hours, and the serum on the top became greenish in colour. This pigment could be dissolved out in chloroform, which assumed a beautiful bluish-green colour and settled at the bottom, while the overlying fluid was brownish.

Intraperitoneal injections of a bouillon culture in a guinea pig caused the death of the animal in less than twenty-four hours, but it caused no reaction when instilled into the conjunctival sac of a rabbit.

Case II. A man aged 25 years of age suffered from headache and occasional burning and itching of the eyes at night. There was no conjunctivitis.

B. pyocyaneus having all the characteristics described above was found in the left conjunctival sac.

The instillation of $\frac{1}{4}$ per cent. solution of zinc sulphate into the conjunctival sac four or five times daily cured the condition and caused the disappearance of the organism, from the second case, in a few weeks.

J. Jameson Evans.

Steiner (Java). **Four Cases of Amyloid Degeneration of the Tarsus.** *Annales d'Oculistique*, December, 1900.

Twelve years ago the author had under his care a case which presented the following characters:—the patient was a native of Java, whose right upper and lower eyelids were the seat of a large hard tumour, apparently involving all the tissues of the lids save the skin. Owing to the swellings the upper lids could not be voluntarily raised nor could either of them be everted by the surgeon ; but between them could be discerned an abundance of yellowish red granulations upon the palpebral conjunctiva. The cornea was in a condition of advanced pannus, and the left eye was trachomatous. Regarding the case as one of malignant disease of the lids, and the right eye having lost all useful vision, the author removed the lids with the tumours, and enucleated the eye. He was surprised, however, afterwards to find on examination, that instead of sarcoma or carcinoma which he had anticipated, the lid masses showed a homogeneous appearance, almost without structure and devoid of cells, and distinctly exhibiting the reaction of amyloid degeneration.

He met with the second case in November, 1899, in which the upper lids of each eye displayed the same condition, the lower lids not being involved. The appearances as to the lids and palpebral conjunctiva were almost identical in each eye; but in the left the cornea was ulcerated, and vision reduced to hand-movements, the vision in the R.E. being $^{6}/_{24}$. The following operative procedures were carried out. On the right side the skin was horizontally divided 3 mm. from the ciliary border and the tumour removed, leaving, however, a thin layer which rested upon the conjunctiva. On the left side, owing to the extensive destruction of the conjunctiva, the whole of the lid with the tumour was removed, only preserving the ciliary border, which together with the redundance of skin resulting from the extension of it by the growth, served to form a new lid of sufficient thickness. The result was satisfactory. The lids relieved of their growths could again be raised, and the patient was able to open his eyes without difficulty. The masses on subsequent examination showed the characteristic reaction of amyloid degeneration.

In the third case the patient had had " bad eyes " for many years. During the last two a tumour had formed upon the right upper lid which had prevented him from voluntarily raising it. The growth was hard to the feel, suggesting the consistence of cartilage ; eversion was impossible. The conjunctiva was trachomatous, the cornea partly in a condition of pannus. An operation for removal of the growth was carried out, similar to that described above. The mass on section showed partial calcification, and the reaction of amyloid degeneration was readily obtained.

While the previous patients were Malays, the fourth patient was of mixed parentage, his father being a European, and his mother a native of Java. A tumour of cartilaginous hardness occupied the lower lid. Differing from the preceding cases its surface was nodular: the conjunctiva was congested and somewhat swollen: the palpebral surface of the upper lid showed signs of antecedent trachoma: the cornea was intact. The R. E. was healthy. The growth was removed, with a satisfactory result. On section the mass responded to the test for amyloid degeneraton, though in a less marked degree than that exhibited by the other cases, owing, as the author believed, to the degenerative process being in a less advanced stage. The author points out that while this disease of the tarsus is practically unknown in Europe, Malays are particularly exposed to it, because, as he believes, of the prevalence among them of severe forms of trachoma, which constitutes by far the commonest ocular disease to which they are subject. Amyloid degeneration of the tarsus is purely a local affection, not depending upon any cachexia, and occurring in otherwise perfectly healthy individuals, in whom no evidence exists of amyloid degeneration elsewhere in the body.

The literature of this subject is very meagre. A case is recorded by Prout, in the *New York Archives of Ophthalmology*, vol. viii, of sarcoma of the tarsus and conjunctiva of the lid, with amyloid degeneration, and in Wecker's "Ocular Therapeutics" a description is given of a disease to which he assigns the name of "Amyloid Degeneration of the Conjunctiva." "When the lid is everted," he says, "the tarsus is apparently covered with a thick layer of wax. This doughy mass rests upon a tarsus, which is itself thickened and metamorphosed." He mentions, however, that these cases must not be confounded with trachoma.

PERCY DUNN.

LOTIN. **The Treatment of Lachrymal Fistula by Electrolysis.**
Archiv für Augenheilkunde, June, 1908.

LOTIN, following Lagrange and others, advocates the treatment of ordinary lachrymal obstruction by electrolysis. His method is to connect the negative pole of a battery with a probe, insulated as far as 2 cm. from its lower end, which is passed down the lachrymal canal while the wire of the positive pole, wrapped round with cotton wool moistened with salt solution, is inserted in the corresponding nostril. A current, gradually increased to 5 milliampères, is passed for 3 or 4 minutes, and it is claimed that with weekly sittings a cure is more rapidly effected than with the ordinary treatment by probes and syringing. With lachrymal fistulae the procedure is slightly different. The negative electrode is still connected with a probe in the lachrymal canal while the positive electrode is connected with a wire passed into the fistula itself. Two out of three cases of chronic fistula treated in this way were completely cured, one after a single sitting, the other after five sittings. A. H. T.

KÖNIGSHÖFER (Stuttgart). **Treatment for Incipient Cataract.** *Medicinisches Correspondenz-Blatt des Württembergischen Aertzlichen Landesvereins.* 47, 1908.

IN the records of the thirty-fifth meeting of the Heidelberg Ophthalmological Congress it is stated that Römer of Greifswald, had attempted to arrest the further development of subcapsular cataract by the internal administration of a preparation of crystalline lenses removed from animals. His contention was that if this form of cataract was produced by some specific "zytotoxic" action of tissue products upon the lens, it was worth while to endeavour to arrest the development of senile cataract by administration of lens substance internally, so that this injurious action should be neutralised.

Römer asserts that the good results thus obtained were too striking to be merely coincidental. Königshöfer puts in a claim for priority in that in 1897 he had made similar observations: he devised a plan by which the lens could be extracted from an animal without (? any) change in the biochemical reaction of the lens substance; he has now been able to "market" the lens substance thus obtained as a white and tasteless powder. He treated a large number of persons suffering from cataract with this substance, but was compelled to admit that when one was dealing with a malady whose rate of progress it was almost impossible to prophesy it behoved one to be more careful than ever not to jump to any hasty conclusion in favour of the drug.

CASEY A. WOOD (Chicago). **A System of Ophthalmic Therapeutics.** Chicago: Cleveland Press, 1909.

ONE is filled with astonishment at the amount of material which has been written regarding the therapeutics of eye disease when one handles this large volume—more than 900 pages, including the index. Perhaps a sad feature of it is the melancholy fate of so many drugs and remedies which were introduced with hopes so high of the cure of this or that disease, and now barely rescued from the pit of oblivion by the all-embracing grasp of the distinguished and erudite author. Two important facts in regard to the book stand out prominently; these are that surely every single drug that ever was recommended or employed is mentioned in it, and that the whole is most astonishingly up-to-date, for here and there articles which only appeared after the middle of 1908 are referred to. One unfortunate feature could not altogether be avoided: it is a certain amount of repetition and overlapping, which is a pity when the book is so large at any rate. As an example of this we may refer to "Intraocular Medication." This is a sub-heading in Chapter IV under Classification of Ocular Remedies (a curious phrase), where, by the bye, there is no real description of intra-ocular medication, but only of subconjunctival injection of air, the exact technique being described. Yet the same sub-heading again occurs in Chapter V under Technique of Ophthalmic Therapy; and here the technique is not dealt with. In the sections dealing with the different remedial agents employed, and with various diseases, the same matter is referred to again. All this repetition means increase in size of a volume already more than sufficiently extensive.

The plan of the book is in its main features to deal first—after some preliminary and historical remarks—with the classification of remedies, then with internal remedies, with electricity, and with sera; next follow two chapters, to which we shall refer again, pitchforked in between these and the treatment of systemic diseases affecting the eye, nervous diseases, etc.; then follows a very useful chapter on General Anæsthetics in connection with Ophthalmic Surgery, and next ten chapters (200 pages) dealing with the various remedies employed. As these follow one another in alphabetical order it is not easy to see what is gained by division into chapters. Ocular hygiene, errors of refraction and their treatment, squint, and then the treatment of regional affections, occupy 240 pages. In the following chapter, on Ocular Headache, the statement is made with some justice, though it may be put too strongly, that migraine is rarely curable by correction of error in refraction —a statement which will not be received with humble acquiescence by all the fellow-countrymen of the author.

The two chapters, to which reference was made as being introduced somewhat forcibly, so to speak, into the middle of the book, have as their themes, respectively, A Scheme for the Systematic Examination of the Eyes of School Children, and Examination of Corporation (*i.e.*, Railway, etc.) Employés; the former may be excused on the plea that if it does not deal with therapeutics it has at least a bearing on prophylaxis; the latter, however, is quite out of place: it does not deal with therapeutics at all.

The whole book is not from the pen of Dr. Casey Wood, though the major portion is; several well-known surgeons have assisted him in its production, undertaking different sections.

To sum up. The book is one of great value as a reference work—one might almost say a reference library, so complete is it—and the only drawback it has is that it is redundant in several ways. Much more severe editorial pruning and more strict condensation would have exhibited greater wisdom and would really have enhanced its high value.

While we say this we should like at the same time to commend the author for his restraint in this very particular in the historical section. He has kept it within very reasonable bounds when he must have been sorely tempted to be discursive regarding the quaint and unattractive pharmacy of ancient days, when the "urine of an innocent boy, cooked in a brass vessel," gazelle dung, turtle's brain, blood of a lizard, milk of a woman who has borne a male child, lion's gall, and such like readily purchasable trifles were among the ingredients of favourite remedies.

We have noticed a small number of errors, chiefly in names, but only of a minor character. There is a copious and comprehensive index.

The Medical Annual for 1909. Bristol: John Wright and *Sons.*

It is wonderful to note how thoroughly this yearly volume is kept up to the times: to this rule the latest issue is no exception. The volume itself is too familiar to require any general description, and in regard to the entries in it which chiefly concern ophthalmic surgeons one need only say that they are entirely practical and deal with all the most recent suggestions in pathology and treatment. For most of these entries Dr. Maddox is responsible. If any criticism at all has to be offered it might be that in some of the sections the methods and matters dealt with are not precisely new,—but that is a very small fault indeed, if—as seems to be the case—no really useful new material has been omitted. Even a very diligent and widely-ranging reader of journals will find much to interest and instruct him.

A. Terson. **Diseases of the Eye.** Paris: J. B. Baillière et Fils. 1908.

This volume of 400 pages forms part of a large work on General Surgery "Nouveau Traité de Chirurgie," and is from the pen of the distinguished French surgeon, A. Terson. The name alone is sufficient to recommend it, for M. Terson is a surgeon highly respected in his own country, whose name is well and favourably known here also. We can hardly suppose that the volume will compete for popular favour very seriously with the home product, but there being no fiscal obstacle to the introduction of a foreign book we can recommend this thoroughly comprehensive and eminently readable French treatise to the favourable notice of the profession in these islands.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Friday, July 9th, 1909.

In the absence of the President, Mr. Marcus Gunn, Mr. Priestley Smith *took the chair.*

Card Specimens.

Dr. F. W. Edridge-Green showed a new *Spectroscope for Testing Colour Vision.* This instrument was a great advance on the spectroscope he had shown for the estimation of colour vision at an earlier meeting of the Society. It was constructed, and the adjustments of the instrument were so graduated, that readings could be taken direct from the instrument without the necessity for using calculation tables. In the focus of the instrument are two movable shutters, either of which is capable of moving across the spectrum. By means of the two shutters any given portion of the spectrum can be isolated. Each shutter is controlled by a drum graduated in wave lengths, so that the position of the edges of the shutters can be known. The accuracy of the graduation is to 5 Angstrom units. With this instrument it is possible to ascertain the exact size of portions of the spectrum which appear monochromatic and their varying size with different persons. It is also possible to determine the limits of variability on both sides of the spectrum, the exact size and position of the neutral band in different dichromics and the position of the most luminous portion of the spectrum.

Mr. N. Bishop Harman showed charts of *Pedigrees of Three Families with Eye Defects.*

1. *Posterior polar cataract.* The lens defect took the form of a mass of opacity in the posterior layers of the lens proper; it was supposed that a hyaloid artery persisted. In one case the opacity extended to the nucleus, and in another projected from the front of the lens through the pupillary opening, so forming a true "axial cataract." In the first generation no defect could be discovered from the available evidence. In the second generation two were affected. Both married and had affected children; the elder had three children blind in five, the younger all three children blind. Of this third generation one had

married (to a woman who had previously born a normal child to another man) eight children were born, two were blind and four had minor eye defects. All were dwarfed both in stature and in mind.

2. *Anterior polar cataract and microphthalmia.* The globes were very small, corneæ measuring 7 mm., with marked squint, nystagmus, and minimal vision. In the first generation a woman (the condition of her eyes is not traceable) married twice, and it is interesting to find that in each childship she had an affected child. One of these affected children married a woman from a normal family, of their eight children two are blind. Two of one childship—one affected and one not affected—died insane.

3. *Lamellar cataract.* A boy of 14 was found to have bilateral cataract, slight in one eye, marked in the other. His teeth were honeycombed in the extreme. The boy's father had identical defects and both had suffered severely from fits in the first year of life. Investigation of the connections of the family showed that no lens defects had appeared in any member in any branch; only it was found that the man's children had feeble viability, for of five only one survived the second year.

Mr. Harman thought that a germ-plasm transmission of defect could not certainly be held to explain such a likeness in father and son, similarity in conditions of life might be sufficient, but the point could only be decided if and when the boy had progeny. Of the other two histories there could be no doubt that the transmission of a germplasm defect was responsible for the inheritance of the eye conditions.

PAPER.

Messrs. A. Lawson and Mackenzie Davidson read : "*A Preliminary Note on the Treatment of Eye Disease by Radium.*" The cases chosen for treatment by this means had been selected on account of their well-known character for intractability or virulence. Seventeen cases had been under treatment : 10 were corneal ulceration, 3 were hypopyon, 4 were non-ulcerative keratitis, 2 of episcleritis, and one of relapsing vesicular keratitis. The results obtained were distinctly encouraging In the treatment of these cases with radium they were careful to eliminate complication in determining the effective curative agent, so no other treatment was used at the time save a simple boric lotion, and atropine in ointment to dilate the pupil.

Method of administration. The radium was contained in sealed glass tubes. The eye was well cocained and the blunt extremity of the tube was placed in direct contact with the diseased part, and moved over the area if large. The exposure was from three to five minutes, and on from one to four occasions. The dose, or amount of radium exhibited, varied considerably, for they had in view the determination of what results could be obtained from variable quantities. So little as 5 milligrammes were used in some cases, and as much as 49 milligrammes in others. The glass capsule of the tube acted as a screen preventing the action of the alpha-rays, but the beta- and gamma-rays were permitted to pass to the tissues. So far they had not been able to correlate dose and effect, nor the time and frequency of exposure with the effect obtained. The application caused a very little pain, described as "numbing" and "throbbing," it rarely lasted more than a few hours, but in one case it continued for three to four days, and in another for twenty hours. In one case they observed retinal irritation following exposure. and in a case of trachomatous pannus the exposure caused considerable pain and increase of vascularity.

So far they had not tried the effects of radium on old scars of the cornea, but upon skin scars, particularly keloid, its effect was truly remarkable. They could not say it had any selective action on tubercular keratitis, tubercular lesions of the skin were little if at all affected by it, in great contrast to its curative action on epitheliomata and rodent ulcers.

Presentation of the Nettleship Medal.

Mr. Priestley Smith said he regretted exceedingly that Mr. Marcus Gunn was not present to do the special honours of the occasion. It was one that was unique for the Society : the medal was founded in honour of the man whose image and superscription it bore, and the Selection Committee of the year had found that there was no one whose work had done so much to further their enterprise as Mr. Nettleship, to whom he handed the medal.

N. B. H.

MALFORMATION OF THE CORNEA IN CASES OF INHERITED SYPHILIS.*

By Prof. E. Fuchs (Vienna).

In a few years it will be half a century since Mr. Hutchinson gave the first clear and complete account of the later symptoms of inherited syphilis with special reference to its effects upon the eye. Interstitial keratitis more than any of the others will always be connected with the name of Mr. Hutchinson. The period which has since elapsed has fully confirmed Mr. Hutchinson's statements, which were so complete that scarcely anything of importance has since been added. I beg, therefore, to be excused for being so bold as to offer some observations as a very trifling contribution to Mr. Hutchinson's work.

It has struck me that in some cases of interstitial keratitis the cornea is obviously a vertical ellipse. The normal cornea, when examined from behind after dissection of the eyeball, is round. Seen from in front, it appears horizontally oval, because the nontransparent limbus of the conjunctiva encroaches upon the cornea more at the upper and lower margins than at the nasal and temporal sides. So the oval shape of the normal cornea is only apparent and not real. This is not so in the case of a vertically oval cornea, the form of which is a real one and is independent of the limbus.

It is not more than a year since I first became aware of the frequent coincidence of interstitial keratitis and vertically oval cornea and began to take notes of such cases. Their number, therefore, is still very limited. Nor have I had time to peruse all the existing records of cases of interstitial keratitis in order to see whether in some of these the malformation of the cornea had been noticed. Further investigations are also required as to the cause of the malformation. Moreover, having regard to the incomplete state of my observations, I would not lay them before you, were it not for the wish to have as a subject for my paper a disease for the knowledge of which we are particularly indebted to British ophthalmologists, especially to Mr. Mackenzie and to Mr. Hutchinson.

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* Read at the Meeting of the British Medical Association (Ophthalmological Section), July 1909.

Neglecting cases of very slight malformation, I collected during the last year 28 cases, in which either one or both corneæ were strikingly oval vertically. Amongst these 28 cases on record there are 20 female patients, which is in accordance with the fact that interstitial keratitis is much more frequent amongst females.

Half of the 28 cases, namely 14, had interstitial keratitis; there were besides 5 cases of chronic iritis, 1 case of unilateral congenital cataract, and 2 cases of corneal opacities, probably due to strumous keratitis. The remaining 6 cases were in old people with senile cataract. As in advanced age the proof of inherited syphilis becomes more and more difficult, I shall, with regard to this disease, take into consideration only the first 22 cases. In 8 of these there was good evidence of inherited syphilis, in 8 others some indication of it; 6 cases exhibited no symptoms of syphilis.

As regards the cases of interstitial keratitis, only half of them were fresh cases. In the other half the opacities caused by interstitial keratitis were already of long standing, and in some instances were detected only when examined on account of the abnormal shape of the cornea.

As the number of cases of fresh interstitial keratitis presenting themselves in my clinic during the last year was about 50, it is evident that the malformation of the cornea is by no means a common occurrence in interstitial keratitis. On the other hand there were 14 cases with oval cornea and no signs of present or past interstitial keratitis. If we leave out of consideration the six cases in aged people, half of the remaining cases presented evidence or at least suspicion of inherited syphilis. I conclude from this that an oval cornea is many times more frequent in cases of inherited syphilis and especially in those in whom interstitial keratitis will likely occur, than it is in the bulk of the other patients. I am far from believing that an oval cornea should never be present in an individual exempt from inherited syphilis. The malformation of the cornea behaves in this respect like most of the other symptoms of inherited syphilis, none of them, considered alone, being an absolute proof of this disease.

As an illustration to this assertion I may mention the case of a brother and sister, each with a strongly oval cornea. The brother exhibited, besides an interstitial keratitis, a number of characteristic symptoms of inherited syphilis, whilst in the sister nothing could be found but a rather typical chorioiditis in the periphery of the fundus.

I excluded from my investigation all cases in which the malformation of the cornea was only an integral part of a congenital malformation of the whole globe. In cases of congenital coloboma of the iris the cornea, as a rule, is vertically oval, but so as to form a real oval, namely narrowing downwards, whilst in cases of inherited syphilis the cornea exhibits the exact form of an ellipse. A really oval-shaped cornea may sometimes also be found without a coloboma as a minor degree of congenital anomaly.

The malformation of the cornea as a rule is present in both eyes, but in 6 of my 28 cases it was one-sided

(5 times in the left eye only, once in the right eye only).

It was easy to surmise that the form of the cornea would have an influence upon its curvature. Indeed the ophthalmometer proves an inverse astigmatism to be present in most of the cases, the amount varying mostly between 3 and 5 dioptrics.

The dependence of the astigmatism upon the shape of the cornea becomes evident in a case in which the right cornea was round with an astigmatism of 0·5D according to the rule, whilst the left oval-shaped cornea presented an inverse astigmatism of 5D.

In all cases but one the flatter meridian was not exactly vertical, but was inclined with its upper end to the nasal side.

Only three of my cases were exceptions as to the astigmatism, presenting only the usual physiological astigmatism together with a marked oval-shaped cornea.

PREVENTION OF BLINDNESS.

Two Committees have recently had under consideration the question of the prevention of blindness, and have devoted special attention to ophthalmia neonatorum as one of the chief causes of loss of sight. Their reports are now published and may be summarised as below.

One of these committees was appointed at the International Conference on the Blind, held at Manchester in July 1908, and consisted originally of persons connected with the care of the blind in institutions and with their education, but, recognising fully the urgency of the matter of ophthalmia they, at their first meeting, co-opted as members of the Committee two ophthalmic surgeons, that they might have the benefit of medical advice on the point.

The following are the recommendations of the Committee:—

1. That in the opinion of this Committee the adoption by the Public Health Authorities of the Early Notification of Births Act is urgent.
2. That in the opinion of this Committee the disease known as the "Ophthalmia of the New-Born" should be added to the list of diseases compulsorily notifiable under the

powers of the Infectious Diseases (Notification) Act of 1889.

3. That in the opinion of this Committee:—
    (*a*) More definite teaching should be given to midwives on the seriousness of eye disease in children; and
    (*b*) They suggest that the Central Midwives' Board should issue more stringent instructions on the danger of "whites" in lying-in women.

With a view to obtaining more exact knowledge of the incidence of "blindness" in subsequent census returns, the Committee recommend that the Registrar-General should be requested to define and classify "blindness" in his schedules in some such way as the following:—

1. Stone Blind, *i.e.*, the individual has no power to see the movement of fingers before the eyes.
2. Partially Blind, *i.e.*, in the case of—
    i. *Children.* Those who have not sufficient sight (even with the aid of glasses) to be taught in an ordinary school.
    ii. *Adults.* Those who have not sufficient sight (even with the aid of glasses) to earn a living by ordinary means.

In conclusion, the Committee desire to emphasise the fact that the question is at the present juncture, and is likely to be in the future, of much greater importance than in the past. For the introduction and extension of the operation of the Employers' Liability Act is seriously affecting, and is likely still more seriously to affect, the earning powers of adult workers with defective vision.

The other Committee was appointed by the British Medical Association, associated with members appointed by the Royal Society of Medicine (Sections of Obstetrics and Gynæcology, and of Diseases of Children), by the Ophthalmological Society and by the Incorporated Society of Medical Officers of Health.

The conclusions of this Committee as to the prevalence of Ophthalmia Neonatorum are thus stated:—

SECTION I.

1. Ophthalmia Neonatorum accounts for upwards of 10 per cent. of all cases of blindness.

2. As far as can be judged from returns cases of Ophthalmia show a slight but steady decrease.

3. Ophthalmia Neonatorum is still the cause of at least one-third of the blindness in British Blind Schools.

SECTION II. Contains the recommendations of the Committee as to preventive methods.

A. ADMINISTRATIVE AND EDUCATIVE MEASURES.

(*a*) *Notification.* It is advisable to urge upon the Local Government Board that notification should be compulsory.

(*b*) *Inspection and Treatment.* It should be the duty of the Local Sanitary Authority, upon receipt of notification, to enquire as to facilities for treatment, and, if these be deficient, to arrange for the efficient treatment of the disease.

The treatment of infantile Ophthalmia should not involve separation of mother from child if this can be avoided.

(*c*) *Bacteriological Examinations.* It is suggested that bacterioscopic examination of vaginal or conjunctival discharges should be undertaken, free of charge, by the Local Sanitary Authority, when a request for such is made by a qualified medical practitioner.

(*d*) *Educative Measures.* Notices regarding the danger of Ophthalmia Neonatorum should be issued by Local Sanitary Authorities. They should also be exhibited in Post Offices and other public places. Such notices should be periodically distributed by the Local Supervising Authority to every midwife whose name appears on the roll of midwives for the particular area concerned.

(*e*) *Central Midwives Board.* The presence of purulent vaginal discharges should be included by the Rules of the Midwives Board among the conditions for which medical help should be summoned.

(*f*) *Maternity Hospitals.* It is recommended that among the members of the medical staff every Maternity Hospital should include an ophthalmic surgeon. The maintenance of accurate records concerning Ophthalmia Neonatorum is suggested as a means of keeping the disease constantly under the notice of all concerned.

B. MEDICAL MEASURES.

I. *Treatment of cases presumably normal as regards danger of Ophthalmia Neonatorum.*

Where a medical man is not in attendance the midwife or nurse should adopt the following routine:—

(i.) Directly the head is born, and before the eyes are opened, the lids and the surrounding skin should be wiped clean, a separate piece of sterilized wool being used for each eye.

(ii.) Nothing should be dropped into the baby's eyes.

(iii.) The face and the body should not be washed in the same water, fresh water should be taken for each.

II. *Treatment of cases in which the mother suffers from a purulent vaginal discharge.*

(*a*) *Mother.* If there is a purulent vaginal discharge, whether in pregnancy or labour, medical help must be obtained.

(*b*) *Child.* If a doctor is not already present when the child is born, he should be sent for immediately, in order that any necessary application to the child's eyes may be made.

III. *Procedure when an affection of the child's eyes is observed.*

If there is any inflammation of the baby's eyes, however slight, shown by redness, swelling, or discharge, the midwife or nurse must explain that the case is one in which the attendance of a registered medical practitioner is required, and medical help must be obtained in accordance with the Rules of the Central Midwives Board.

SUGGESTIONS TO MEDICAL PRACTIONERS.

The following simple measures are advised, which it is believed are in accordance with the most recent knowledge and experience.

A. *In presumably non-infected cases.*

As regards the mother a policy of non-interference.

In the case of the child, the practitioner should make it his business to see that as soon as possible after the head is born, and before the eyes are opened, the eyelids are cleansed with sterilized wool, and that separate water is used to wash the baby's face and body.

B. *Confinements where infection is known or suspected to exist.*

(*a*) *Mother.* The discharge should be examined bacteriologically and appropriate treatment adopted.

(*b*) *Child.* The baby's eyelids should be carefully wiped free from secretion with sterilized wool, and a single drop of a one per cent. solution of silver nitrate should be placed in each of the baby's eyes.

The Committee recommend this strength as being less irritating than the two per cent. solution originally recommended by Credé. Although there is some evidence to prove that a twenty-five per cent. solution of "Argyrol" is efficient and non-irritating, it has not been used extensively enough to justify a dogmatic statement as to its value.

The suggestions deal only with the prevention of Ophthalmia Neonatorum, and not with its treatment when once established.

> [On presentation of this report at the Annual Meeting of the British Medical Association exception was taken by several members to the "Suggestions to Medical Practitioners" on the grounds that they were based on a gratuitous assumption that the general practitioner was completely ignorant of the subject, and that they would stereotype and give the stamp of authority to methods of treatment which were by no means necessarily the best possible. On being put to the vote this part of the report was deleted.]

We understand that the first step towards the practical carrying out of the recommendations of these Committees has been taken by the Staffordshire pottery towns of Fenton, Longton, Newcastle-under-Lyme, Stoke-on-Trent and Burslem, whose sanitary authorities have applied to the Local Government Board for leave to extend the application of the Infectious Diseases Act to the disease Ophthalmia Neonatorum within their own particular boundaries. This means that in such towns any case of purulent conjunctivitis arising within fourteen days of birth must be notified to the sanitary authority, the onus of notification being placed on the head of the family, and also on any medical practitioner in attendance as soon as each becomes aware of the nature of the disease.

The Local Government Board is strongly hoping that similar action will be taken by all local health authorities throughout the kingdom.

REVIEWS.

FUCHS (Vienna). **Sympathetic Ophthalmia.** v. Graefe's *Archiv für Ophthalmologie*, 70, 3.

IN this article Fuchs contributes some further cases of sympathetic ophthalmia of a very unusual type, and claims that they strengthen the position he took up in a previous paper (*v. Graefe's Archiv*, 56, p. 365) on the pathological appearances characteristic of the disease in question.

The first case is that of a man of 32, whose left eye had been blinded 29 years previously without any known cause. When seen by the author the left eye was shrunken, but absolutely uninflamed and free from pain, even on pressure. The right eye had been misty for the previous three weeks, but was not injected or painful. Keratitis punctata, hyperæmia of the papilla, fine vitreous opacities and fine opacities in the retina surrounding the papilla were present. The pupil was quite free and dilated fully to atropine. In the choroid, beyond the area of small retinal opacities already referred to, there were numerous yellow spots, mostly of very small size, but a few as large as half the diameter of the papilla.

A careful investigation detected no cause for a spontaneous irido-cyclitis, but as the entire freedom from inflammation of the blind eye rendered a diagnosis of sympathetic ophthalmia unlikely, both mercurial inunction and tuberculin -R injections were given a trial. It was also considered right to excise the blind eye. In spite of these measures the eye rapidly became worse, running the ordinary course of a severe sympathetic ophthalmia, and becoming finally atrophic.

The pathological examination of the excised blind eye indicated that it had probably been lost as a result of purulent inflammation of the cornea. The thick layers of organised exudation in the interior of the eye were partly ossified, but the main point of interest lay in the discovery of the specific inflammatory appearances in the choroid, although the iris and ciliary body were free. These appearances were those already described by Fuchs in all cases of genuine sympathetic inflammation, *i.e.*, small-celled infiltration with epithelioid cell nests and many large giant cells.

In commenting on this case the author regards as noteworthy the outbreak of sympathetic ophthalmia due to a shrunken eye which had remained free from all inflammatory symptoms for 29 years; the fresh sympathetic type of inflammation occurring in the choroid of the exciter; the nature of the sympathetic inflammation, namely the early and conspicuous inflammation of the choroid. The simultaneous outbreak of such a number of foci of infiltration in the choroid seems to render it probable that the poison must have been distributed through the ciliary vascular system. The appearances resembled those produced by Stock after the injection of tubercle bacilli into the general circulation, and support the theory of a metastatic origin of sympathetic inflammation.

The author next records two cases in which sympathetic disease followed comparatively slight injuries which were not followed by plastic inflammation of the injured eye. In neither case was the injured eye excised. The author narrates these cases as tending to show that plastic inflammation and endophthalmitis are no essential part of the sympathetic process and that this is a specific form of inflammation which may or may not be accompanied by these other phenomena.

The next case is one in which the injured eye was excised thirty days after a perforating injury of the cornea followed by prolapse of iris. Sympathetic inflammation of the fellow eye followed 19 days later, of a fairly severe nature, but recovering completely by the end of two years.

The examination of the enucleated eye shewed a very mild grade of endophthalmitis. The typical sympathetic form of inflammation was confined entirely to the uvea and was very slight. The cell clumps consisted entirely of lymphocytes, neither epithelioid nor giant cells being present. This the author attributes to the very short period that had elapsed between the injury and the excision.

The next case described is the only one that, in spite of careful investigation of all excised injured eyes, the author has been able to find, in which the sympathetic type of inflammation was present without any effect on the sound eye. In this case the eye was excised 17 days after a perforating injury on account of the onset of panophthalmitis. The examination of this eye shewed, in addition to the endophthalmitis, an unusually intense form of sympathetic inflammation, in fact to such an extent did this go as to form an extraocular clump by perforating the sclerotic. The author admits that it is possible to find anatomical appearances indistinguishable from the sympathetic type in cases of spontaneous irido-cyclitis, but in his experience this is extremely rare, the only two cases hitherto met with in his clinic being those described by Botteri (*v. Graefe's Archiv*, 49).

The last case described is believed to illustrate the earliest stage of sympathetic type inflammation. In this case the eye was excised five days after a perforating injury by a steel splinter, which was removed with the magnet two days after the injury. Enucleation was performed on account of the onset of panophthalmitis. Numerous foci of lymphocytes were found in the choroid, the vessel walls being perforated by the cells in several places. Fuchs is inclined to think that these foci of infiltration had nothing to do with the purulent endophthalmitis because they in no way corresponded with the situation of the inflammation in the retina the inflammation in the latter being of a diffuse character and mainly confined to the inner layers, whereas the foci in the choroid never reached the capillary layer and were scattered irregularly. Also the cells in the retinal exudation were frequently polynuclear, but in the choroid lymphocytes only were found. While admitting that the statement that this case represents the earliest stage of sympathetic exciting inflammation can only be the expression of an opinion, the author considers such a case of great importance as shewing how soon after an injury this peculiar type of inflammation may set in. He regrets that he is as yet unable to say more as to the nature of the process by which the inflammation extends or as to its cause.

The plate that accompanies the paper illustrates some of the points mentioned. E. E. H.

Leber (Heidelberg). **The Pathogenesis of the Retinal Changes in Nephritis.** *v. Graefe's Archiv für Ophthalmologie,* 70, 1.

At the outset the author gives reasons for discarding the theory that the retinal and kidney affections are to be traced to a common cause. He accepts the view that the retinal changes are the result of the disease in the kidney, and the object of his paper is to trace the connection between these two conditions. He directs his attention chiefly to the fatty deposits in the retina which give rise to the ophthalmoscopic appearances both of small white spots and of the larger white patches. Litten has recently denied the occurrence of fatty cells in this connection and Greef says that fatty degeneration does not suffice to explain the large white spots. Leber, however, is of the opinion that these authors have been deceived by the removal of fat from their preparations by the ether contained in the celloidin used for embedding.

He prefers to speak of fatty infiltration rather than of degeneration, since there is often very little visual disturbance in spite of well-marked ophthalmoscopic changes, and in view of the recoverability of the changes. The fat, in other words, has not arisen *in* the retinal elements but has passed *into* the retina from without. The deposit of fat in the retina occurs in two forms, namely, as fat-containing cells and as an infiltration of the supporting tissue of the retina. The former are found chiefly in the outer and middle layers, and the latter in the form of fat droplets arranged in rows along the course of the glia fibres. It appears as if the fat-filled cells must have wandered into the retina from its outer surface, those most densely filled with fat being stopped at the outer layers where they remain as large globular cells, while others containing less fat have been able to insinuate themselves into the inner retinal layers and spread themselves out along the course of the Müller's fibres and other fibrous structures. The author also observed fatty cells in the walls and lumen of obliterated vessels. This was chiefly seen in the choroid. Signs of proliferation of the pigment epithelium were observed, and he found that the fat laden cells also contained in greater or less abundance granules of the fuscin pigment native to the cells of the pigmented epithelium. He concludes, therefore, that the fatty cells are in reality pigmented cells which have taken up fat, have lost more or less of their pigment, and are wandering into the retina. As there is no constant relation between the quantities of fat and pigment in the cells, he is able to set aside the idea that the fat could result from a destruction of the pigment granules.

His view is that the subretinal and retinal sero-fibrinous exudation contains a certain amount of fat derived from the blood (the fat content of which has been stated to be increased in some cases of nephritis). This is absorbed by the pigment epithelial cells, more especially by those which by proliferation are lying free in the exudate.

The author discusses the view, until recently widely accepted, that previous changes in the blood-vessels of the retina and choroid are the cause of the changes under discussion. He agrees with those who hold that these vascular changes are not the necessary link between the kidney disease and the retinal affection. That link he finds in a slowing of the blood-stream in the retina due to such causes as failure of the heart's strength or excessive narrowing of the smaller arteries, aggravated by the pressure of the intraocular fluid, to which the retinal vessels are subjected. He thinks that this slowing of the circulation with its consequent interference with nutrition is able to explain the appearance of the fatty infiltration brought about as already described, as well as the vessel changes themselves, which he describes as thrombosis of choroidal veins; heaping of leucocytes, especially in the veins; endothelial proliferation, especially in the small arteries; and infiltration of the walls of the smaller vessels with fibrinous and albuminous exudate.

A. J. Ballantyne.

Calderaro (Palermo). **Photopsiæ after Removal of the Globe.** *La Clinica Oculistica*, March, 1909.

Under ordinary conditions photopsiæ are generally considered to take their origin in the retina, or—in other cases—in the cerebral cortex (as in scintillating scotoma), and it only occasionally happens that we may meet with a person who after enucleation is still annoyed by photopsiæ, and that to a serious extent. In such cases the stump of the optic nerve may be involved in the conjunctival cicatrix or in a patch of chronic inflammation of the orbital tissues. In one case of this kind Calderaro has observed the symptoms carefully and has examined too the enucleated eyes and small portions excised from the stumps of the optic nerves; there are almost no similar cases in literature. His case was that of a man of 50, a shopkeeper, who had never enjoyed good sight. In subdued light particularly his sight was very imperfect and he had to be led about after sun-down, though in a good light he could read and write. He was a nervous, excitable man, but with no disease of note, or history of any such; he was married and had three healthy looking sons.

Six years ago the right eye began to have attacks of subacute glaucoma of "emotional" origin; these became more and more frequent and severe, gradually destroying vision in spite of treatment by miotics, iridectomy, etc. It was during this period that the patient first began to be annoyed by photopsiæ and chromatopsiæ in this (right) eye; at first these photopsiæ were present only during the attack of glaucoma, but latterly they became constant and were the cause of great annoyance to him, so much so that in hope of getting rid of them he at length submitted to evisceration of the right eye—already blind and, at times, very painful. Most unfortunately, however, even after the operation, the photopsiæ were just as troublesome as before, and the condition of glaucoma persisted in the remaining eye. The notes as to the condition of that (the left) eye, taken in September, 1904, describe slight congestion of the anterior ciliary veins, a transparent but slightly anæsthetic cornea, shallow anterior chamber, dull iris with immobile pupil, rather oval in shape, the vitreous slightly turbid, and the disc pale and cupped; the arteries in the fundus narrow and thready, irregular black pigment patches scattered chiefly along the course of the vessels and particularly about the equatorial region. The tension was somewhat increased and the field of vision much narrowed concentrically; vision = counting fingers at 4 M. In the right orbit the remaining stump after excision was slightly tender, both spontaneously and on pressure. It was thought better to recommend removal of the stump, which was carried out, the nerve being cut across about 1 cm. posterior to the remains of the eye. At the same time pilocarpin was employed, and vigorous general treatment, with the result that the glaucomatous symptoms in the right eye became decidedly lessened, though the light sense showed little actual improvement. Indeed, matters rather grew worse, and in less than a year the retinitis and glaucoma together had practically extinguished all sight. The unfortunate patient began then to suffer from severe left-sided hemicrania, which together with the photopsiæ rendered his life so miserable that he at last induced Prof. Francaviglia to enucleate that eye also in May, 1907. The operation did not, however, bring about entire relief, for though the pains in the head were greatly assuaged the photopsiæ remained, and presently the headaches returned, left-sided at first but later over all the head.

As regards the photopsiæ, the patient describes himself as though seeing a (pale or dark) red coloured fluid moving in a wavy fashion in the left half of the field of vision; the movement takes place in all directions, but chiefly from above downwards. At another time it seemed as if the movement took its origin in the orbit, the flashes darting out from the centre of the left orbit and spreading in all directions, and having a reddish colouration, always most intense when the symptom was most obtrusive. As a rule the left hemicrania was less while these photopsiæ were at their maximum, and vice versa.

Examination of the patient disclosed no signs of hysteria, or any indication of disease of any organ; the orbits were quite healthy to all appearance. But no means which Calderaro could devise, no drug which he instilled into the conjunctiva, injected into the orbit, or introduced into the system, and no variety of electric current, had any effect in mitigating to more than a very slight degree the severity of the subjective symptoms. Finally he injected cocain, dissected out the nerve and removed as much of it as he could get hold of, but again without result. Before the actual removal, he waited for a few minutes till the effect of the cocain had passed off, and tested the sensitiveness of the optic nerve, but moderate pressure on it with forceps excited no luminous sensation on the part of the patient, and no pain; the actual section of the nerve, or rather of the sensory filaments accompanying it, was attended with sharp pain. Removal of the stump of the nerve made not the slightest difference to the pain and photopsiæ, and though in one of the nerves there was more complete atrophy and breaking down of the nerve elements than in the other there was in neither any suggestion of cicatricial compression or of chronic inflammatory change.

The facts being as above stated, there being no sign of ascending atrophy (even if a process so definitely negative could be supposed capable of giving rise to a positive reaction such as photopsiæ), and no collateral or other evidence of any fascicular cerebral alterations, Calderaro finds himself forced to the conclusion that the seat of the irritation must have been the visual cortex. W. G. S.

Delord and Bernardou (Nîmes). **Complete Traumatic Luxation of the Globe.** *L'Ophtalmologie Provinciale*, April, 1909.

In the *Ophthalmic Review* for July, 1906 (xxv, 193), there was published an original case by Gad of complete dislocation of the globe in a new-born child, as the result of the application of forceps. This rare accident is described by Delord and Bernardou as occurring in a patient of theirs under the following very different circumstances. A man of 52, rather addicted to alcohol, was brought into hospital one evening suffering from an accident which had happened to him the same day about four hours before. Just after his midday meal, being at the time in his usual good health, he walked into his room, when he became giddy, lost consciousness, and fell, striking his face upon the edge of a dish but not injuring the eye. Recovering consciousness he tried to rise, but fell again, this time on the other side, striking his head and his right eye upon a strong double hook which was attached by the side of the fireplace with great violence. He was able again to rise but suffered very severe pain in the right eye, and noticed at once a very serious loss of vision, for unfortunately for him it was his better eye which had been injured. He managed to drag himself to the mirror, when he saw, to his horror, that his right eye was hanging on the cheek, completely out of the orbit; there was hardly any hæmorrhage. This was confirmed on his examination at hospital, when the lids were found tightly closed *behind* the globe, which appeared to be barely held in place by shreds of tissue. To the globe itself, which was of normal size, there was no injury whatever, and the tension was maintained at normal. Apparently all the exterior muscles were divided, the rectus superior about 12 mm. from its attachment, and the others at a greater or less distance. The cornea was quite unaltered; there was, however, no vision whatever, not even perception of light.

The lid aperture had been extended by a wound opening up the outer canthus, about 10 mm. in length, this wound being covered by blood clot. The orbit was filled with a large hæmatoma, which pressed forward the lids and kept them tense. Below the lower lid there was a crescentic wound on the cheek, the concavity directed upwards, about 6 cm. in length, but there was no sign of any fracture of the bones of the orbit.

The patient was anæsthetised, and it being found impossible to reduce the dislocation, the optic nerve, which really remained the only attachment of the eye, was divided with scissors, and with that enucleation was complete. There was an uninterrupted recovery.

The authors enter into a disquisition as to the mechanism of the lesion which, under the circumstances, seems almost needless.

W. G. S.

ROLLET and AURAND. **Experimental Optic Neuritis and Sympathetic Ophthalmia.** *Revue Générale d'Ophtalmologie*, 28th February, 1909.

THE authors of this paper record the results of experiments carried out by them in the production of inflammations of the optic nerve and of the retina and choroid by the local inoculation of certain bacteria and their toxins. The micro-organisms which they used were the pneumococcus, the influenza bacillus, the diphtheria bacillus, the staphylococcus, the streptococcus, and the tubercle bacillus. The experiments in all cases were made on rabbits. An inflammation of the nerve head, recognisable in life by œdema and congestion, or microscopically by hæmorrhages and sub-pial œdema, appeared in all cases, the time of development varying from three days in the case of the pneumococcus up to fourteen days in one experiment with the tubercle bacillus. This papillary change seems, however, to have been only a part of a generalised inflammation of the tissues of the eye and the optic nerve, which in one case resulted in a panophthalmitis. In one case, using the tubercle bacillus, they produced not only changes in the eye inoculated but similar changes in the opposite eye and nerve. The authors are inclined to lay a great deal of stress on this case. They italicise the words "Nous avons donc obtenu pour la première fois une véritable ophtalmie sympathique ou plus exactement une neuro-rétinite tuberculeuse sympathique." Unfortunately the eyes and the optic nerves alone were examined and no examination was made of the cerebral meninges nor of the base of the brain, and though the case is one of great interest as it stands we fear that readers of the paper will not agree fully with the authors that they have solved the problem of the mode of transmission of the infection of sympathetic ophthalmia.

Much of the argument of the paper is based on the assumption that the papillary œdema that accompanies a true inflammation of the nerve, and that which develops in the condition we know as choked disc, are exactly comparable.

The present writer regards this assumption as quite unjustifiable, and considers that in so far as it has been made it vitiates the value of the paper, which is, none the less, an interesting and valuable piece of work.

LESLIE PATON.

JULES VERGNE. **Ocular Lesions in Paget's Disease.** *Annales d'Oculistique*, Nov., 1908.

THE general characteristics of Osteitis Deformans may be briefly summarised as follows:—

It commences between the ages of 45 and 55 and extends over a period of 12 to 15 years. The cranial vault is enlarged in all its diameters, the bones attaining a thickness of 2 to 3 c.m. The inferior maxilla is not as a rule affected. The shafts of the long bones of the leg are greatly thickened, the normal ridges and crests disappearing and the contour of the bones being markedly curved in such a way that the thighs and knees are widely separated and the tibiæ arched.

The long bones of the arm, the spinal column and scapulæ may also be affected; the hands and feet usually remain normal.

The subjective symptoms are few or wanting: vague pains, and sometimes deafness and failing vision, are the chief of them.

Various theories have been put forward from time to time as to the nature of the disease. Paget himself regarded it as a chronic osteitis, caused by a cancerous diathesis; others have thought that it was a chronic rheumatic osteitis, an osteitis due to some undefined infective agent, a senile form of osteomalacia, or again a disease, like acromegaly, due to a lesion of one of the ductless glands.

Lannelongue in 1903 put forward the view that it was a late and rare manifestation of syphilis, and this view is strongly held by the author of this article.

In most of the recorded cases of the disease there has been nothing to call attention to the eyes, and there is no record of their condition; but Vergne gives notes of three cases in which the ocular condition has been carefully investigated.

The first, reported by Fréchon in 1903, was that of a woman aged 73. As regards her family history, her mother had had six pregnancies, four of them ended in miscarriage, or early death of the infant.

The patient was weakly from birth, and slow in developing both mentally and physically. At 17 a corneal ulcer formed in the right eye. At 40 she became deaf, and the vision in the left eye became impaired. When she was 45, after getting wet through, the right leg became swollen and remained permanently enlarged and curved, with constant pain in the bones. Twenty-eight years later the left leg began to enlarge and became similarly deformed. She had never married and had had no children.

When examined she presented the usual appearance of osteitis deformans with typical enlargement of the cranium, tibia and femur of both legs, also of the iliac bones, spinal processes, ribs, scapulæ, clavicles, and the upper half of each humerus and bones of the forearm in the upper third of their extent.

The eyes showed large patches of choroidal degeneration, consisting of white areas surrounded by masses of pigment. There were also secondary lenticular opacities in each eye.

In the left there were extensive vitreous opacities, while the right cornea had a large nebula the result of the corneal ulcer referred to previously. The vision of the right eye was merely perception of light, the left counted fingers at 20 c.m.

2nd case (observed by Vergne):—

The patient was first examined in 1906.

Family history:—Father died at æt. 62 of heart disease: he was twice married, by the first wife he had 5 still-born children and 1 living. By the second wife, one child only (the patient), born at full term but always delicate. The patient walked late and was rachitic. When 3 years old an attack of measles caused corneal ulceration in both eyes, leaving the right with a leucoma-synechia, and the left with a central corneal opacity. At 18 years, a severe attack of conjunctivitis affected both eyes. He married when 23 and had one child, who died from meningitis when one month old.

In 1895, when 35 years of age, he fell in the street and fractured the anterior tuberosity of the left tibia. Four years later he fractured the left humerus, and during the treatment the left forearm was fractured by too forcible massage with passive movements.

In 1903 the left humerus was again broken at the previous site. In 1895 he first noticed a commencing deformity of his legs, which slowly progressed until 1907. When examined he had the typical appearance of osteitis deformans. Few subjective signs were present, occasional nocturnal cramp only was complained of. His intelligence memory and sensation were normal, but his reflexes were slightly diminished.

His sight was very defective and became rapidly worse: when seen in 1907, the right vision was $^2/_{10}$, the left $^1/_{25}$. In 1908, V.R. = $^5/_{35}$, V.L. = Fingers at $2\frac{1}{2}$ metres. In both eyes the field of vision was slightly diminished, that for red and green markedly so. There was also in both eyes a paracentral scotoma, larger in the left. The fundi showed the following appearances:—

Right:—Disc pinkish-white with ill-defined margins. Surrounding the disc to a distance of 4 disc diameters was a patch of atrophied retinal fibres, devoid of pigment, with irregular outline. The vessels showed signs of sclerosis. There were also scattered patches of pigment. The rest of the fundus was normal.

The left fundus presented similar appearances.

3rd Case (also examined by Vergne).

A patient, 60 years old, who some time previously had been diagnosed as suffering from osteitis deformans, complained of diminishing visual power since 1902. At that date the sight of the left eye was already considerably affected, but with the right he could read quite well and noticed nothing wrong with the vision of this eye.

In 1903 the right eye began to fail rapidly, so much so that he was unable to read.

When examined in 1904, the pupils were equal and retained their normal reflexes; the media were clear except for some faint peripheral striæ in the lenses.

The left fundus displayed a white atrophic patch, without any pigmented margins, in the macular region: the disc and the vessels were normal.

The right fundus showed signs of a more recent choroiditis in the macular region, where yellowish patches with ill-defined margins were seen, while around the disc were numerous choroidal lesions of a speckled and marbled appearance. No pigment masses were present.

V.R. = $^5/_{50}$. V.L. = Fingers (excentrically). Peripheral field of vision normal.

From the appearances of the fundi in these three cases, the author considers the lesions to be chorio-retinitis in different phases of its progress, case 2 being the transitional form between cases 3 and 1. He regards the lesions as being typically syphilitic.

No myopia or tuberculosis was present in any of the cases. The diminished vision might be put down to the thickening of the cranial bones causing obstruction of the optic foramen, but no such constriction has been found to exist. Acquired syphilis was not present in any case.

In conclusion it seems reasonable to suppose that hereditary syphilis, which no doubt produced the ocular lesions, might also have been the exciting cause of the osteitis deformans.

WILFRID ALLPORT.

GINSBERG. **Retinitis Pigmentosa.** *Klinische Monatsblätter fur Augenheilkunde*, July, 1908.

IN this paper Ginsberg gives a detailed account of the microscopical examination of the eyes in a case of retinitis pigmentosa in which the disease had been known to exist since 1895, and where general tuberculosis had developed 8 years later, terminating fatally in 1905. The patient was a male subject, aged 35, of illegitimate birth; nothing was known as regards consanguinity of the parents; he had suffered from night blindness for fifteen years. An examination of the eyes had been made when he was 25 years of age, and had shown yellowish grey, opaque optic discs, with very small vessels, the periphery of the fundi from the equator forwards dotted with fine black and light spots, the former being mostly in the form of streaks or angular particles, with few of typical bone-corpuscle form. There were slight posterior polar cataracts, and in the right the remains of a persistent hyaloid artery. The fields exhibited a general contraction down to about the 25° circle in both eyes, no peripheral visual areas being apparently obtainable. Treatment by inunction and iodide of potassium was tried for a short time, but with no beneficial result. Ten years later, three months before death, another ophthalmoscopic examination was made, when much the same condition was found, with the exception that the discs were more atrophic, and a somewhat smaller number of pigment masses was thought to be present.

In microscopical sections the outer layers of the retina were chiefly affected, the neuro-epithelium being almost entirely destroyed, and the inner granular layer narrowed and loosened, with a good deal of fibrous tissue development, and a certain amount of cell infiltration; but the macular region was well preserved in one eye, although in the other it shewed the unusual complication of a macular hole. Evidences of some degree of optic neuritis and of inflammatory processes in some parts of the choroid were found, which appeared to be the result of tubercular deposits; but excepting these Ginsberg satisfied himself that on the whole the choroid, especially as regards its vascular system, was intact.

From these observations Ginsberg draws the conclusion that there is no connection whatever between the retinal changes and the choroidal circulation in retinitis pigmentosa, thus once more rejecting the vascular origin as a cause of this disease. He considers the affection as primarily belonging to the neuro-epithelium, which, by disintegration, gives rise to products influencing secondarily the pigment epithelium. If, he argues, the affection were primarily a vascular one, then in senility, in chronic nephritis, and in old glaucomatous eyes, in which conditions vascular obstruction is frequently met with, we should expect to find similar changes, yet the neuro-epithelium in these cases generally remains intact. In order to explain this spontaneous degeneration of the neuro-epithelium he has to suggest a congenital weakness in the standard of functional activity imparted to these cells, so that they have not grown in proportion to the demands made upon them, and therefore gradually go to pieces; and he puts forward labyrinthine atrophy as a possible analogy.

Apart from the question as to whether the term retinitis pigmentosa should not be applied solely to those cases of primary pigmentary degeneration, there is some evidence to shew that this case was not unlike one of secondary degeneration in many points; and the effects of the optic neuritis induced by the tuberculosis do not tend to simplify the histological examination, but rather make it difficult to draw conclusions in regard to the cause of retinitis pigmentosa from a case thus complicated.

The ophthalmoscopic picture in Ginsberg's case does not entirely correspond with that usually seen in primary pigmentary degeneration, and the field of vision does not give us any assistance. It should be remembered also that it is not unknown for definite changes to occur in other parts of the body as a result of disturbance of the circulation, without any histological manifestation of definite disease in the vessel walls themselves.

MALCOLM L. HEPBURN.

PH. VERDERAME and L. WEEKERS. **Experimental Investigation of the Bacteriolytic Action of the Bile and its Salts on Organisms Pathogenic in the Eye, especially Pneumococcus; and their utility in Pneumococcus Infections of the Cornea (Ulcus Corneæ Serpens).** *Klinische Monatsblätter für Augenheilkunde*, September, 1908.

FOR many years the antiseptic character of the bile had been maintained by some authors and denied by others, but the more recent researches of Neufeld, Levy, Mandelbaum and others have established the fact that the bile and the bile salts exert a bacteriolytic action on the pneumococcus and the nearly related streptococcus mucosus, while most of the other organisms remain unaffected. This induced Gabriélidès and Morax, independently of one another, to employ bile in the treatment of ulcus serpens corneæ.

The first experiments of Weekers were made with the bile itself, and with solutions of bile salts, upon the pneumococcus, streptococcus mucosus, diplobacillus, xerosis bacillus, bacilli of diphtheria and influenza, gonococcus and staphylococcus from cases of conjunctivitis. The results confirmed those of previous authors as regards the bacteriolytic action of the bile salts upon the pneumococcus. The time required varied with the strength of solution used, 15 minutes sufficing with 5% solution. With strong solutions and longer contact the author found that the other organisms mentioned might be killed, but bacteriolysis did not take place.

These experiments, like those of other investigators, were carried out with bouillon cultures. In order to test the action of the bile salts under conditions more nearly resembling those met with in actual treatment, Verderame instituted a series of experiments on the pneumococcus contained in pathological exudates, such as pus from the tear sac, and conjunctival secretions, as well as rabbits' vitreous artificially infected. The material after being submitted for a definite period to the action of the bile salts was washed and then investigated (1) by smear preparations, (2) by culture in ascites-agar, and (3) by inoculation of the vitreous of rabbits.

This procedure also confirmed the previously ascertained bacteriolytic action of the salts in question. No difference could be detected in the relative efficacy of the taurocholate and the glycocholate, but the bile itself was found to act better than either, a fact which the authors are unable to explain. It was found, however, that neither with the bile nor with its salts, was it possible to produce complete lysis of the pneumococcus embedded in pus or mucus, unless the former were employed in concentrations or for periods of time which were quite out of the question in practice.

Moreover, when put to the test in cases of ulcer of the cornea of pneumococcal origin, the results were not encouraging. (The ulcer was bathed for a short time four to six times daily with a neutral 2½% solution of Merck's taurocholate of soda.)

In view of the doubtful results of the treatment, and taking into account the difficulty of obtaining fresh bile, the variability of its activity, and the expensiveness of the pure salts, the authors feel that they cannot recommend others to give the method a trial. A. J. Ballantyne.

Verhoeff and Carl Fisher (Boston). **An Improved Method of Bleaching Pigmented Tissues.** *Archives of Ophthalmology*, September, 1908. Vol. 37, No. 5.

After experimenting with Alfieri's method of bleaching sections of pigmented tissues, the writers have found that by making use of the reagents recommended by Alfieri, but in solutions of greatly increased strength, they have been able to reduce the time required from hours to minutes, and to obtain more constant results. Contrary to what might have been expected the sections are not made more brittle by the stronger solutions. Celloidin should be used for imbedding.

Of the various strengths tried, the following give the best results:—(1) Potassium permanganate, saturated aqueous solution (1:16). This should be made up with the aid of heat; it will keep *in the dark* for some weeks. (2) Oxalic acid, saturated aqueous solution (5 per cent.). This should also be made up with hot water.

Sections are passed to the permanganate solution from water. For most specimens, 20 minutes will suffice; this bleaches even the pigment epithelium of the iris. Wash in water, and place in the oxalic acid until the brown stain of the permanganate is completely removed; five minutes is usually long enough. Wash in water and stain.

The writers have found that the best results are obtained after fixation in Zenker's fluid or formalin. After alcohol fixation the nuclei stain poorly. Sections bleached by this rapid method have taken the various stains as well as those bleached by the slower method of Alfieri, the resulting picture, however, being clearer on account of the more complete depigmentation.

Blood pigment and the usual extraneous pigments do not bleach by this method, so that it affords a simple means of differentiating them from autochthonous pigments.

J. B. L.

CONNOR (Detroit, Mich.). **Conditions under which the Striæ of Incipient Senile Cataract Appear and Disappear.** *Ophthalmic Record*, June, 1909.

CONNOR bases this paper upon his own observations, upon records gathered from medical literature, and upon private contributions which he has received from "distinguished ophthalmologists," whose names he does not mention, "in every part of the world." His own cases included one of diabetes and six of large, fleshy, flabby widows, with chronic constipation, coated tongue, foul breath, and more or less conjunctivitis and blepharitis. In addition three had a high degree of hypermetropia, three astigmatism of moderate amount. In the cases of incipient cataract communicated to him, diabetes was present in 20 cases, syphilis in 3, nephritis in 4, rheumatism in 1, arterio-sclerosis in 2, intestinal infection in 20.

The author claims that the recovery of lens transparency depends upon the attention given to treatment which improves the nutrition of the entire body, together with the use of remedies which act locally upon the nourishment of the lens. In general he holds that the cases are most favourable for treatment in which the striæ are due to lymph in the space between the nucleus and adjacent fibres, the rest of the lens being healthy, "though sluggish in its activities." Next there are the cases in which to the foregoing arrest of development of the lens fibres is added actual destruction of the contents: and lastly the cases of striated opacities associated with diabetes and syphilis. The following are the conditions of treatment laid down: (1) "Cases are refracted with the utmost care"—presumably by this is meant that the error of refraction in the patient is properly corrected; (2) With closed lids the eye are soaked in water as hot as can be borne for ten minutes, thrice daily, after which the conjunctival sac is treated with a few drops of a saturated solution of boric acid; (3) Vibratory massage of the eyeballs and nape of the neck, lasting two or more minutes, according to the reaction produced, is gently applied three times a week; (4) Dionin is used once a week, or oftener, according to the effect; (5) Overstrain of the eyes, by using them too much or in a bad light, or in unfavourable postures, is forbidden; (6) At the first visit a careful study is made of the ears, nose, mouth, and pharynx, and such measures taken as will remove all possible disturbance of eye nutrition; (7) If an accomplished and trustworthy internest be available—[but who and what is an "internest"—presumably a sewer man engaged in flushing sewers would approximately exemplify this unusual expression] the case is referred to him for an exhaustive study of every part of the nutritive apparatus, and such treatment as is needed to restore normal conditions. Most important is it that the infections of the large intestine be cleared out, and constipation and indigestion relieved. Diet, exercise, and bathing must be minutely regulated, and in syphilis, arteriosclerosis, diabetes and allied conditions the usual additional treatment described.

Although the author does not suggest anything which is particularly new in the treatment of these cases, the notes of two of which he subjoins, illustrative of its good effects, he nevertheless draws attention to a point in the management of patients with senile cataract, which is destined in the near future to attract much consideration. That senile cataract is not necessarily an attribute of age, but rather a proof of the failure of general nutrition, which, among other evidences, displays its presence by the development of lental opacities, is now generally admitted. The point, therefore, to be decided is the cause upon which this general nutritional change depends, and the time seems to be approaching when we shall probably find that the cause in question is closely related to the action and inter-action of some intra-cellular ferment, with which probably the maintenance of the necessary nutrition of the body generally is closely identified. The ferment treatment of disease, even so far as it has gone, has shown encouraging signs; but the researches into the subject are of so complex a nature, so bewildering in detail, that progress in knowledge and of ascertained facts in this regard can only be of very gradual evolution. Meanwhile, what is more likely than that the resort to some ferment treatment might prove in the end to solve the problem of regaining the transparency of a lens in which incipient cataractous changes were manifest?

PERCY DUNN.

SPINDLER. **Errors of Refraction and their Correction by Glasses.** Paris: Masson et Cie., 1908.

THIS is a small book of about 160 pages with numerous illustrations. From the preface by Dr. G. Weiss we learn that the intention of the author is to provide a practical guide for those who wish to work practically at errors of refraction and their correction, but more especially for those medical men who have no opportunity of attending a course of ophthalmology.

Any attempt to acquire a working knowledge of errors of refraction from reading alone, we believe, must always be tedious and unsatisfactory. It is very doubtful whether Spindler has lightened the task of those for whom his book is intended, or has placed the subject in a clearer light than is to be found in numerous treatises on the same subject. The illustrations are poor.

HOLTH (Christiania). **The Diagnosis of Central Colour Scotomata by the simultaneous presentation of three small coloured objects.** *Annales d'Oculistique*, September, 1908.

IN 1893 Holth observed Prof. Bjerrum detect the scotoma in a case of tobacco amblyopia in the following way. The patient was placed with his back to the light and fixed with one eye the top button of the observer's waistcoat, on each side of which was a red disc of 3 cm. diameter. These discs were of equal colour, but to the patient the one on the temporal side appeared paler than that on the nasal, because its image fell on the affected part of the retina The method seemed to Holth to be a practical one, and it was found to be so in patients whose visual acuity did not exceed $^5/_{20}$: above this, smaller test objects were necessary. For these the author used the rose-red ends of certain Norwegian matches—by soaking the heads of these in water the white salts were removed and a uniform rose tint obtained. The matches were stuck into the end of the box, the middle one being vertical the two lateral obliquely inclined and so arranged that the heads were all in the same horizontal line. The patient fixes the central match head and is asked concerning the colour of the other two.

In order to avoid the trouble of preparing the matches and fixing up the little apparatus each time such was needed, the author has had a permanent one made upon similar lines. This consists of a bar of ebonite, 16 cm. long by 2 broad, and 4 mm. thick; on each of the faces small circular pits 1 m.m. deep are drilled. On one face these are 5 m.m. diameter and on the other 10 mm., the distance between them being 4 cm. on each face. The pits are filled with rose-coloured wax finished off flush with the surface. In using the instrument it is held horizontally 30 cm. from the patient, parallel with the window —which is directly behind him. The upper border is slightly inclined forwards so as to avoid reflection. The patient fixes the central disc. In tobacco amblyopia the temporal disc is always altered in colour, being washed out—or perhaps discoloured. The test is extremely sensitive and has given positive results even in cases where the visual acuity was as high as $^5/_{10}$ to $^5/_6$. When the scotoma is absolutely central the central disc is the palest of the three, the others preserve their colour.

The central object also becomes pale in advanced paracentral scotoma of tobacco amblyopia.

It is to be observed that this method of detecting scotomata is only applicable to those cases which owe their origin to a toxic or infectious neuritis. The small irregular paracentral scotomata of macular choroiditis, hæmorrhages, or other lesions, are more easily detected by perimetry with small test objects at 1 or 2 metres (Bjerrum), or by the stereoscopic method.

J. Burdon-Cooper.

CLINICAL AND THERAPEUTIC NOTES.

The Treatment of Gray Cataract by Resorcin.

Elze (*Wochenschrift f. Ther. u. Hygiene des Auges*) uses resorcin in the treatment of early cataract, in the form of a half- or one-per cent. ointment made up in yellow vaseline; this is applied to the conjunctiva once a day for two or three weeks, with "far-reaching results." A visual acuity of J 16 has been improved to J 7, and of J 9 to J 3; these, he says, are practical results, and they are lasting.

He states that striæ that are once definitely formed are not altered by the treatment, but that the intervening portions of the lens are cleared, hence it is important to make an early diagnosis, and initiate the treatment as early as possible.

Proceeding to discuss the reason for his adopting this drug, he says that the impression made on his mind of the power possessed by certain fibrolysins of promoting the absorption of the fibrous or fibrinous nodules of rheumatism led him to examine the possibilities of the epidermal medicants producing some influence on, or the changes in, the epithelium of the lens. Of such drugs chrysarobin and pyrogallol were too irritating to the conjunctiva to be of service, but in resorcin he found a perfectly bland medicant.

In conclusion, he states that it is quite possible to obtain on the average an improvement in visual acuity of from three to four grades of Jæger's types, but that it is of no use to attempt a cure when the vision has fallen below Jæger 12 or 14. In all cases the glasses giving the best vision should be ascertained and worn by the patient.

N. B. H.

THE DANGERS OF ATOXYL.

COPPEZ (*La Clinique Ophthalmologique*, 10th June, 1909) uses a recent case of blindness from atoxyl as the text of an exhortation to ophthalmologists to warn their colleagues who are concerned with the treatment of syphilitic affections and tropical diseases of the dangers of this drug. In the case in question a man of 54, the subject of inherited syphilis, interstitial nephritis and cardiac lesions, received a series of 10 injections of 5 centigrammes each of atoxyl; the affection of sight began after the first injection, and after the fifth blindness was complete; but the medical man in charge of the case, haunted by the idea of a syphilitic arterio-sclerosis, saw in this only an indication for pushing the remedy, by diminishing the intervals between the injections. No ophthalmoscopic changes were visible at first, and Coppez, who was unaware of the nature of the drug that was being employed, looked on the case as one of uræmic amaurosis. It was not until five weeks after the onset of blindness that the first signs of pallor of the nerve became apparent. No recovery of vision occurred.

Many similar cases have now been recorded, and much discussion has arisen as to whether the arsenic or the aniline in the drug is to be blamed for the effect on the optic nerves. Coppez has no doubt that the disastrous result is due to the aniline, a drug which, as soon as it begins to accumulate in the organism owing to any defect in the eliminating apparatus, becomes excessively dangerous.

In this connection it may be noted that BERGER (*Knapp's Archives*, July 1909) reports the case of a woman of 36, apparently in good health, who, after the use of a hair dye which contained aniline, suffered from headache and defect of vision of the left eye. The disturbance took the form of a central scotoma, and examination shewed the left papilla reddened. But it does not appear certain from Berger's account that the aniline was necessarily the cause of the attack, which certainly much resembled an ordinary retrobulbar neuritis.

SILVER OPACITIES OF THE CORNEA CLEARED BY HYPOSULPHITE OF SODA.

In a case described by MARQUEZ (*La Clinique Opht.*, 10 Dec., 1908) there was almost complete opacification of the cornea in both eyes, due to repeated instillation of 5 per cent. silver nitrate. When Marquez saw the patient he thought that the opacities were due to chloride and albuminate of silver, and sought to dissolve these incrustations of silver salts by means of a solution of hyposulphite of soda, in the following manner.

Having cocainised the cornea to such an extent as to soften the epithelium, he carefully scratched the surface of the cornea with the back of a Graefe knife, taking care not to go deeper than the epithelium; the eye was then held in an eye bath containing a solution of hyposulphite of soda for 10 minutes; this bathing was repeated three times in all during the day. The eye must be well cocainised as the first baths are very painful. From the first days there was notable clearing of the right eye, which was alone treated, the left remaining absolutely opaque. The left eye was then treated in the same manner, with like results. Never before has Marquez seen opacities of this sort clear in such a marked manner, and he thinks that the action of the hyposulphite of soda deserves further study.

He does not mention the strength of the solution he employed.

E. M. L.

LEPROUS KERATITIS.

Leprosy is known to exist in Brittany, in certain villages of the lower Rhône valleys and the Maritime Alps. Perrin, in a thesis published in 1899, recorded as many as eleven cases seen in Marseilles.

The following case, reported by ROCHE (Marseilles) in the *Recueil d'Ophtalmologie*, April, 1909, is of particular interest as it agrees very well with that shown by Mr. Treacher Collins at a recent meeting of the Ophthalmological Society of the United Kingdom, so far as the general character of the lesions is concerned.

The patient is a woman aged 30 years. Her family history is excellent, her husband and her one child, born the year the disease commenced, are quite healthy.

The cornea of each eye presents large gray masses that look like fatty infiltrations which unite the cornea and the conjunctiva; they blend with the latter so that the line of demarcation is lost. There is no inflammatory reaction. The changes were at first rapid in development but now appear stationary. The cornea is not anæsthetic. The other parts of the eyes (the irides and the media) appear quite normal.

Over the rest of the body are found numerous tumours and ulcerations: forehead, chin, eyelids, lips, are all affected. The palate is ulcerated; and tumours are scattered over the limbs. The diagnosis was decisive on account of the innumerable bacilli of Hansen found in the discharges of the ulcers and in the saliva. The reporter discusses the possible source of infection, and traces her places of abode since childhood, but can come to no conclusion other than that she had contracted it in Marseilles.

N. B. H.

An Unusual Foreign Body.

Petit (*Rec. d'Opht.*, April 1909) records the following case: the patient was a woman of a North African tribe; she was admitted into hospital with intense inflammation of the lids and conjunctiva of the left eye; the preauricular gland was inflamed, and the state was such that phlegmonous inflammation of the orbit was at first suspected. The pupil was dilated but the colour of the iris was healthy. On examining the lower cul-de-sac of the conjunctiva a huge black foreign body was found embedded in mucus. To the astonishment of the examiners it proved to be fæcal matter, the dropping of a goat! The body was as large as a nut, and gave off an *odeur atroce*. The bed of the conjunctiva from which it was removed was ulcerated. Irrigation with permanganate of potash solution reduced the inflammation and the cure was complete.

Enquiry as to how this mass entered the eye of the woman elicited the story of a conjugal quarrel, during which the husband dragged his wife along the sand: this had occurred four days before the onset of the symptoms.

N. B. H.

OPERATIONS ON THE GLOBE IN PRESENCE OF CHRONIC DACRYOCYSTITIS.

By S. Johnson Taylor, M.B.,

Hon. Ophthalmic Surgeon, Eastern Counties Asylum.

Upon one point there must be absolute unanimity amongst ophthalmic surgeons, viz., that operations upon the eye, and especially those involving the opening or puncturing of the globe, are fraught with the gravest danger where the lacrymal passages are in an unhealthy condition.

It would nowadays be considered highly improper for a surgeon to perform iridectomy or extraction of cataract on a patient whose lacrymal sac was full of pus, without adopting some measure to render and keep that pus sterile or to prevent the possibility of it coming into contact with the wound.

In the past various preliminary measures have been recommended to get the parts into a healthier condition, such as slitting up and probing the lacrymal passages, syringing them out with various antiseptics, and the application of iodoform styles, strong solutions of protargol, etc., to the interior of the lacrymal sac. All these were more or less beneficial, but they were not certain, and the modern plan of thoroughly dissecting out the lacrymal sac before operating on the eye is by far the best and safest and the one to be adopted in the vast majority of cases.

This can be performed under general or local anæsthesia. Only once, in the case of a young child, have I done it under the former: with that exception, I have always used eucaine and adrenalin, or, more recently and with much greater satisfaction, novocaine along with adrenalin.

Using local anæsthesia, only one assistant is necessary, the hæmorrhage is less, the risk of the general anæsthetic is avoided and also the unpleasant after-consequences thereof, the operation can be performed—as I nearly always do it—on the consulting-room couch, the patient gets up and walks home feeling very little the worse, and can at once resume the usual meals.

But at times—though rarely—it may be undesirable, *e.g.*, in cataract with mucocele in very old, decrepit patients, to submit the subject to more than one operative procedure, if possible, or, in cases of acute or sub-acute glaucoma with lacrymal sac disease, there may be no time to remove the sac, etc.

In such cases, one or other of the methods of blocking the upper and lower canaliculi can be carried out with ease, facility and safety.

The plan I have successfully adopted in three cases of cataract extraction this year, consists in the simple device of ligaturing the upper and lower canaliculi as the first step in the operation.

The parts are well cocainised, some powdered cocaine being lastly applied, a fine probe is passed into the canaliculus and held by an assistant or nurse against the wall of the nose, then a small, well curved needle, armed with a double silk ligature, is passed under and round the probe, taking in a little more tissue than the canaliculus only, whereupon the probe is withdrawn and the double ligature firmly tied : the same is done to the other canaliculus and communication with the sac is thus entirely shut off, as can be proved by there being no regurgitation of pus when pressure is made over the sac.

In one of my cases I failed for some reason to occlude the lower canaliculus sufficiently, and pus still regurgitated on pressure, so I at once inserted the point of the galvano-cautery into the lower punctum and burnt the parts a little.

This last, viz., the application of the cautery to the upper and lower puncta, is another method which has been recommended in such cases, but I think the ligature plan likely to be the more efficient; if necessary, it can always be reinforced by the cautery.

Immediately after the ligatures have been applied, the conjunctival sac is well washed out with sublimate lotion, and the operation proceeded with in the usual way.

As I personally do not like operating for cataract with a very dilated pupil, and, as the thorough cocainisation necessary in this procedure usually causes very decided mydriasis, I apply a little eserine a few minutes before the application of the cocaine, to prevent this.

It is as well also to pass the needles rather near the puncta to leave plenty of room for a repetition of the procedure, should needling of capsule be subsequently required, as occurred in one of my cases.

Very little reaction follows the application of the ligatures, the dressings and after-treatment are not in any way modified: the ligatures often cut out or can be removed a few days after insertion, long before which—especially if a conjunctival flap is secured—the wound in the globe is healed and free from risk of infection.

This method is in no wise a new one, but, on talking it over with friends, I found it was little known, and I myself have never seen it adopted by anyone else and have never used it until this year.

In my three cases the result was entirely successful; in one of them a lacrymal abscess had been incised by myself a few months before, and all three were well marked instances of the affection in question, virulent looking, fluid pus in each case freely regurgitating through the puncta on pressure over the sac.

REVIEWS.

McKechnie. **On Incision of the Eye, with special reference to Incisions for the Extraction of Cataract and for the relief of Glaucoma.** *Archives of Ophthalmology*, May, 1909.

"It is now 163 years since Daviel inaugurated the operation of cataract extraction, yet even now, after so long a period, finality of opinion and of procedure has not been attained as regards the incision most suitable for extraction. The matter is therefore worth examining; and is here investigated from four aspects: the *mechanical*, the *anatomical* and *physiological*, the *pathological*, and the *technical*."

"Mechanical considerations appear to have been neglected, probably because medical men are not as a rule mathematical. Yet we are here dealing with a problem which is largely one of mechanics. Here is a body bounded by two spherical surfaces and containing fluid under pressure; and the problem of what will happen when we incise this body in different directions is available for mathematical treatment."

These are the opening sentences of a long and thoughtful paper, by Captain McKechnie of the Indian Medical Service. It is one which should be studied in the original by those interested; it does not readily lend itself to review, especially the first section, which contains a number of mathematical formulæ and diagrams.

The author endeavours to show the varying effect of intra-ocular pressure upon the lips of an incision in the cornea and corneo-sclera, according to the plane in which the incision lies. He has calculated that, comparing two incisions, *similar in direction, size, etc.*, but of which one is in the corneal and the other in the scleral part of the corneo-scleral region, the magnitude of the force at the wound margin causing gaping, is more than $1\frac{1}{2}$ times greater in the case of the scleral than in the case of the corneal incision. The force tending to keep the wound closed (the "closing component") is about twice as great in the corneal incision as it is in the scleral. This variation is all due to the difference of angle which the plane of the incision makes with the radii of curvature in the two cases respectively. These calculations McKechnie regards as important, especially in reference to operations for the relief of glaucoma. In a case in which a large peripheral incision is made, in a plane approaching that of the forward iris, the closing component will be very small, the opening component will be large. The wound will therefore be a particularly gaping one with very little tendency to close. The further back the knife is entered, the less will be the closing component and the larger the opening component.

In his explanations, on purely mechanical principles, of the failure of operative procedures to relieve glaucoma, or of recurrence of tension after temporary relief, the author seems to us to attempt too much.

It is impossible to state clearly McKechnie's arguments as to the best incision for extraction of cataract without reference to his diagrams. He believes that all theoretical and mathematical considerations which he deals with in this paper show that a *radial corneal* incision is the best. "Indeed the arguments so far brought forward are so overwhelmingly in favour of it that it immediately occurs to one to surmise that there must be some grave practical objection to its use, otherwise it ought to have been generally adopted long ago."

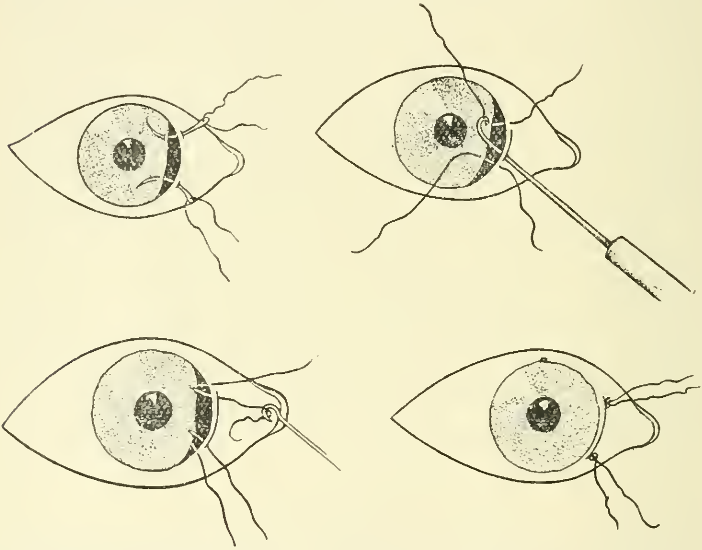
In the remaining paragraphs the writer deals with various objections, and finishes his very interesting paper by giving detailed directions for the "execution of the radial incision for the extraction of cataract in the capsule." His paper is one which merits the careful consideration of every Ophthalmic Surgeon.

J. B. L.

P. C. JAMESON (Brooklyn, N.Y.). **Re-attachment in Iridodialysis: a Method which does not incarcerate the Iris.** *Archives of Ophthalmology*, July, 1909.

JAMESON publishes notes of four cases of traumatic iridodialysis operated upon with success by the method he describes. "It is with some hesitation that I present this operation, knowing that such operations have not been regarded with favour owing to the danger of cyclitis and possible sympathetic irritation. Perhaps this contingency has been enhanced by the fact that operations for the re-attachment of the iris have for the most part depended upon an incarceration of a portion of the iris in a wound made for its reception, in the corneal margin. This operation does not incarcerate the iris, but brings the torn margin in contact with a freshened surface, within the anterior chamber."

The procedure described by the writer is easily explained by the aid of the diagrams which accompany his paper. His aim is—to re-attach the iris as near to its normal anatomical position as possible, and to a fresh surface, but without any incarceration of iris tissue. The technique is obviously very delicate and by no means unattended by risks; one to which the author does not allude is wound of the anterior capsule of the lens.



The following description is almost *verbatim* that of the author. The sutures (two are generally used) are first introduced: the most desirable suture material is horsehair or very fine silk-worm gut. The needle penetrates the sclera 2 or 3 mm. from the limbus; it is carried into the anterior chamber, and under the torn margin of the iris engaging the least possible portion. The iris is impinged against the posterior surface of the cornea by the point of the needle, and both cornea and iris are perforated simultaneously, the needle being drawn through the cornea, and liberated from the suture. The suture now contains within its curve, from point of entrance to exit, conjunctiva, sclera, the edge of the torn iris and the cornea. An incision is now made in the sclera; it should be straight, and extend between the two sutures, but the ends of the incision should have a short bridge of sclera between them and the points of entrance of the needles. A small hook is now introduced into the A.C. and guided between the iris and the cornea, so as to engage that portion of the suture extending from the anterior surface of the iris to the posterior surface of the cornea. This is pulled upon with great care, and the end of the suture which passed through the cornea is drawn back and brought into the A.C. and thence between the lips of the incision, thus liberating the corneal bridge and enabling the sutures to be tied without including the cornea.

The sutures when tied bring the torn circumference of the iris in contact with the inside of the linear incision, and to the points of the primary perforation of the needles, but not between the lips of the incision.

The sutures may be left in for three or four days. The needles should be very keen, slender, and with a larger curve than would be indicated by the path of tissues to be traversed. The perforation of the cornea by the needles is unattended by any untoward result.

The results obtained by Jameson in his cases were very satisfactory. The length of time between the injury and the operation varied from 3 weeks to 7 months.

The writer gives an account of the accidents which may happen, and some of which have happened to him, and justly remarks that it is impossible to decide as to its merits or demerits until a larger number of results are available.

J. B. L.

FAGE (Amiens). **Spontaneous Rupture of the Cornea.** *L'Ophtalmologie Provinciale*, February, 1909.

SPONTANEOUS rupture of the cornea in a case of glaucoma is, all things considered, a rare accident; indeed Coppez, who wrote a monograph on the subject, was only able to collect a dozen or so of published cases. He omitted a few, it is true, but the accident is a sufficiently rare one. Fage relates a case which came under his own care. It was that of a man of 66, somewhat alcoholic and with atheromatous vessels, but without any definite heart lesion and with no albumin in the urine. He had in the left eye absolute glaucoma, with an acute exacerbation lasting some days; in the right eye the condition was in an earlier stage, but there were undoubted signs of glaucoma. Obtaining relief from the acute symptoms in the left eye by means of a miotic and local depletion, he disappeared for several months, when he again presented himself with the story that the eye had kept much in the same state until a couple of days before, when he had experienced a violent pain in it and felt a warm fluid trickling down from it. On examination, the left cornea was seen to have a central ulceration, the membrane itself being dull and insensitive. The actual perforation was a linear "slit," its long axis lying horizontally and measuring about 3 mm. There was no prolapse, but the anterior chamber was filled with a clot which protruded through the perforation, whose lips were distinctly a little infiltrated round about; at the foot of the anterior chamber there lay a fine grayish exudate. The eye becoming septic, Fage eviscerated it. That a staphyloma of the cornea, which is there thinned and weak, should give way need not surprise us, nor the yielding of an ulcerated cornea, nor the spontaneous rupture which may take place when an intraocular tumour begins to eat into the walls of the globe, though in such a case it is rather the sclera than the cornea which gives way; but spontaneous rupture of apparently healthy cornea is a different matter. In Coppez's case an iridectomy had been done previously, the hæmorrhage occurred during a violent fit of anger.

The earliest recorded case dates from 1768, when a Dutch surgeon observed it in his own person; he relates how he felt a hot liquid escape from the eye, giving, after some hours, much relief to the severe pains and high tension. Certain surgeons have found that in these cases the central epithelium of the cornea becomes altered and a tendency to infiltration round about becomes manifest prior to the hæmorrhage, and by and by the cornea may quite suddenly give way.

When examined pathologically the ruptured cornea is generally found to show some signs of weakening of the cornea before the actual hæmorrhage takes place. Some writers speak of it as being deprived of Descemet's membrane.

As Fage points out, the whole eye receives much support from the tissues surrounding it (*e.g.*, Tenon's capsule), and can therefore be distended forwards only; if it gives way one might then naturally expect that the point of yielding should be the cornea, all the more that the prolongation of the period of high tension may lead to superficial erosion of the cornea and degeneration of its substance. Opinions are however divided as to whether it is the hæmorrhage which can fairly be blamed for the rupture, or the degeneration of the cornea, which becomes unable to support the pressure and suddenly gives way, possibly even undergoing partial gangrene from the extreme pressure on the nutritive channels. In such cases it is probable that the cornea breaks down much in the same wholesale fashion as is seen in neuroparalytic keratitis. Both factors probably have their influence on one another, for the blood-vessels are often (as in Fage's case) atheromatous and brittle and liable to give way even spontaneously. It is known too that in a good proportion of one's cases of glaucoma the intravascular tension is high, this prejudicial condition causing a liability to hæmorrhage from sudden giving way of the vessel wall.

W. G. S.

A. TOTI (Florence). **The Treatment of Dacryocystitis by the formation of a fresh Passage from Sac to Nasal Cavity (Dacryocysto-rhinostomy).** Florence, Meozzi, 1909.

IN a pamphlet the author of this method of radical treatment of obstinate dacryocystitis advocates an operation which he has devised with the view of establishing a permanent drain from sac to nose. The operation is specially suitable for cases in which repeated abscesses of the sac have occurred and a fistula has formed, and consists, not in the futile attempt to "probe" the old channel, but in the formation of a new and direct one. In the opinion of its author it is a procedure very superior to that of excision of the sac, but the reviewer has some hesitation in accepting this, for Toti's opinion of that operation (excision) seems to be much lower than his, and the Italian's successes from excision of the sac to have been much less striking and much less uniform than his. But one ought to be willing to make allowance in this instance also for the bias in favour of his own child which is usually exhibited by the father of it. Into the details of the operation it is hardly necessary to enter: the idea is, to cut down at the inner side of the orbit, close to the inner margin of the sac, remove a portion of the inner posterior wall of the sac, turn back the periosteum, and work one's way through the ethmoidal cells to the nasal cavity, and finally remove a portion of nasal mucous membrane equal to, and certainly not less than will correspond to, the opening in the sac. It may be necessary in some of the cases to remove part of the turbinated bone before one can be certain of obtaining a permanent and sufficient tunnel.

The plan, supposing success to be gained, has at least this to recommend it, that the drainage of the conjunctiva will be as nature originally intended it, even if the new passage does not exactly correspond with the old in situation, but is it really necessary or advisable to make apertures in bones at all? We think Toti has overlooked the fact, neglected or not recognised by a number of others also, that in a large number of the cases of chronic abscess of the sac the passage is quite patent.

The author devotes a good deal of attention to the distribution and function of the muscular fibres of the walls of the canaliculi, and to discussion of the views put forward in the Graefe-Saemisch handbook regarding this matter: he believes that the effect of their contraction is to enhance by aspiration the action of capillary attraction in inducing the secretions to enter the canaliculi and the sac. This is one of the arguments which he brings forward in support of his method of operating. He has now carried out his plan in over 40 patients and is more than satisfied with the results obtained.

W. G. S.

G. Ricchi (Bologna). **Paralysis of the Sixth Nerve after Injection of Novocain into the Spinal Canal.** *Rivista Italiana di Ottalmologia*, Jan., 1909.

The patient whose case is described by Ricchi was a woman of 63 for whom, for the painless removal of an inflamed bursa of the right foot, intrarachidian injection of 2½ c.c. of a 4 per cent. solution of novocain was practised with success. But two days after the operation troublesome diplopia set in, produced by paralysis of the right external rectus: the fundus was perfectly healthy. There appeared to be no cause other than the injection to which one could attribute the paralysis, which was still to a large extent persistent after several months. The question is, how does such a result as paralysis of a cranial nerve come about?; for cases are by no means rare. There are, he says, 33 on record;—not perhaps a very large number, but amply sufficient to exclude possibility of mere coincidence. It is not always the sixth nerve which is attacked under these circumstances; it may be third or fourth, or a combination of one of these with the sixth, and even bilateral ophthalmoplegia has occurred, but as in paralysis of other origin, the sixth nerve it is which is by far the most frequently attacked. Nor has the anæsthetic injected into the cord always been novocain; stovain, tropacocaine, cocaine and alypin have all had their victims. The affection comes on some time between the fourth and the twentieth day after the injection, and as a rule is transitory: it may be gone in a week, or may last even for six weeks.

The three points of chief interest, however, are the nature of the paralysis, its precise situation, and the reason for the selection of the sixth nerve.

As regards the first point, a toxic action of the anæsthetic exercised upon the nerve in its course or on its nuclei, somewhat analogous to that manifested by the toxins of diphtheria, cannot be denied. Some writers have suggested the presence of small hæmorrhages, and in favour of their theory they draw attention to the extreme headache often experienced by the patients previous to the appearance of the paralysis. Another suggestion is a neuritis caused by the increased pressure of the cerebrospinal fluid, and yet another a mild form of meningeal infection.

The site of the lesion has been regarded by some as central (nuclear), while others, holding that entrance of the toxic fluid into the fourth ventricle is impossible, are convinced of its peripheral situation: if so, one is at a loss to know why other nerves are not attacked, such as the hypoglossal and the vagus.

The only real attempt to explain why the sixth nerve is the selected one has been the close relation between the oculomotor nuclei and the labyrinth, and the theory that the anæsthetic present in the cerebrospinal fluid has an unfavourable influence on the labyrinth.

Partly at least on account of the great deviation and its presence in the middle line, partly also on account of only one side being affected Ricchi is in favour of a peripheral cause for the paralysis, and in regard to the last of the three questions puts forward the suggestion, mooted by Perna, that the sixth nerve, crossing as it does the cavernous sinus, becomes there impregnated with the toxic substance emanating from the blood into the surrounding tissue. W. G. S.

LEVINSOHN (Berlin). **The connections of the Cerebral Cortex with Eye movements in Monkeys.** *v. Graefe's Archiv.*, 71, 2.

IN this paper the author describes a series of experimental observations on monkeys, in which he endeavours to find an answer to the following questions:—

1. Which portions of the cerebral cortex produce eye movements on the minimal electric stimulation?

2. What is the nature of these movements? Further, are they accompanied by movements of other parts of the body, especially the head?

3. What are the portions of the cortex from whose stimulation there follows a side, that is, a to or a fro, movement of the eyes?

4. What are the results of the extirpation of single, several, or all of the excitable portions of the cortex?

5. What are the connections between those portions of the cortex that produce eye movements on a minimal stimulus, are they all completely separate or are some of the movements brought about through spread of the current by intercentral association tracts?

6. Would the eye movements follow equally as a result of active contraction or of inhibition of the opposing muscles as suggested by Sherrington?

7. Is the preponderance of lateral movements due to their innervation in the cortex outweighing that for vertical movements, and can the latter be made more evident by removing the lateral muscles, as stated by Hughlings Jackson and Risien Russell?

8. What conclusions are we to draw from the observation of the cortical innervation of the eyes in monkeys?

There were 15 experiments, 11 on Macacus Rhesus, 3 on Macacus Cynomolgus, and one on a baboon.

An accurate account is given at full length of the several experiments and comparative tables of the results obtained are drawn up.

The author points out that in all experiments on the excitability of the cerebral cortex extraordinary variations occur in the amount of current required to produce a response.

He sums up his results as follows.

1. The central innervation of the eye movements extends over a wide area of the cortex. It is specially associated with the hinder half of the frontal convolutions, with the angular gyrus and with the convolutions of the occipital lobe. It has been possible to locate in these places definite spots in which stimulation is followed by lateral, and others in which it is followed by vertical eye movements. At the same time it has not been possible to limit these spots with accuracy.

2. The turning of the eyes to the opposite side on stimulation of the cortex remains a constant phenomenon, while the direction of vertical movement is a varying one, largely dependent on the position of the stimulus.

3. The eye movements are either associated with head movements, and especially with movements of the lids, or else occur as an isolated phenomenon. Movements of the lids alone may be obtained by stimulation dorsal to the sagittal branch of the præcentral sulcus. Of these the most constantly obtained is that of lid closing. The centre for this is immediately behind the cross branch of the præcentral sulcus.

4. The readiest response to stimulation is obtained in the neighbourhood of the bend of the præcentral sulcus, especially in the neighbourhood of the frontal sulcus, next in the occipital gyri, chiefly the gyrus angulatus. Since the irritability of these two separate portions of the cortex for eye movements remains unaffected by the removal of either separately it is concluded that they are not in any way dependent on each other. This disposes of the theory that the eye movements are produced through intracentral association tracts, and shews that they owe their origin to cortico-fugal tracts.

5. The eye movements that follow cortical stimulation are

due to active contraction of the affected muscles, inhibition of the antagonists playing only an inconspicuous part.

6. The removal of the muscles affecting lateral movement does not increase the amount of vertical movement.

7. The results of removal of those portions of the cortex concerned in eye movements, with the exception of the hemianopia resulting from removal of the occipital gyri, and the diminished irritability of the eye and its neighbourhood on the opposite side that follow extirpation of the angular gyrus, are almost completely negative. As a result of these experiments no cortical centres for isolated ocular muscles can be located, but only those for associated movements. In all the movements due to cortical stimulation there are at least four muscles employed, two actively and two passively.

The previous statement made by the author to the effect that the eye movements elicited by stimulation of the frontal lobes are always accompanied by head movements is no longer tenable, as the present series of experiments shew that although usually associated it is possible to get either movement isolated. The centre for the head movements is situated rather dorsal to that for the eye movements. The movements associated with stimulation of the occipital lobes are associated with sensations of sight or feeling and are not direct movements following the stimulation. In view of the very fugitive results of extirpation of the whole cortical area stimulation of which produces eye movements it is probable that the centre for position and movements of the eyes is an extremely complex subcortical one, and that the rôle played by the cortical centres is quite subordinate.

The paper is accompanied by photographs and a review of the literature of the subject. E. E. H.

J. v. Benedek (Vienna). **A Further Contribution to the Anatomy of Pre-Retinal Hæmorrhage, together with remarks on the limiting membranes between the retina and vitreous.** *v. Graefe's Archiv für Augenheilkunde*, 70, 2.

E. Klauber (Vienna). **Some Points in the Histology of Pre-Retinal Hæmorrhage.** *(Ibid.)*

In a previous communication v. Benedek recorded a case of "pre-retinal or subhyaloid hæmorrhage" which he had examined microscopically, besides giving a short resumé of the main clinical features of this disease. He here returns to the consideration of these hæmorrhages, more particularly with regard to their course, shape, and situation, as well as to the appearance of their anterior surface.

In collecting such cases it should be noted whether the hæmorrhage appears in an otherwise healthy eye, or occurs in a diseased eye, presenting other retinal hæmorrhages. The former, or "true" pre-retinal hæmorrhages, would only accidentally come to microscopical examination; those of the second class are more commonly met with, and although the appearances that they present are not quite typical, the anatomical conditions, like the ophthalmoscopic, are substantially the same for both groups. v. Benedek here gives a detailed account of the microscopical examination of three eyes with septic retinitis, together with sections from a case of albuminuric retinitis (all belonging therefore to the second group). The publication of these, he thinks, is all the more desirable because in the clinical accounts of cases of this kind views were expressed on the situation of the hæmorrhage that did not correspond with actual facts, and this regardless of the exact description of a case that had been given by J. H. Fisher in the R.L.O.H. reports.

In analysing the various cases that v. Benedek would include under the category of pre-retinal hæmorrhage he has found that in ten out of eleven the hæmorrhage lay between the membrana limitans interna retinæ and the nerve fibre layer; in only one was it in front of the limitans interna. In 8 cases it was situated in the region of the macula; in 5 of these the blood corpuscles had sunk to the lower part of the hæmorrhage —this was a feature peculiar to the macular hæmorrhages. In one of his own cases here recorded this result was prevented by the great amount of fibrin present.

Small extravasations of blood are not infrequently found between the membrana limitans interna and the posterior limiting layer of the vitreous in the region of the pre-retinal hæmorrhage. Rupture of the former and extension of the hæmorrhage between these two layers has been described by J. H. Fisher, and a case recorded by Holmes Spicer showed a similar condition; but in the author's cases where this had taken place the blood apparently came from the vessels of the optic disc. The hæmorrhage may also pass into the vitreous itself.

The condition of the nerve fibre layer in the area of the hæmorrhage is of importance in relation to the anatomy of the retina as well as to the views taken with regard to the anatomical position of the hæmorrhages; in all his cases the surface of this layer was found rough, due to the fact that the nerve bundles were torn apart and Müller's fibres separated from each other.

Sometimes a layer of new formed connective tissue encapsules the extravasation of blood; this may so modify the ophthalmoscopic picture that white streaks or patches appear on the surface of the hæmorrhage, and a white cicatrix ultimately results.

Detachment of the retina surrounding the hæmorrhage may also occur; v. Benedek believes that in his cases this had arisen through the traction which the membrana limitans exerted on the retina as it was pressed forwards by the extravasated blood.

For the differential diagnosis as to the hæmorrhage being in front of or behind the membrana limitans interna, it is important to note the presence or absence of reflexes in the form of undulating glistening bands that can often be observed over the surface of the hæmorrhage; for although it is true that in both cases the ophthalmoscopic picture may be the same the author cannot conceive how the posterior limiting layer, or hyaloid membrane, of the vitreous can give such a light-reflex as the membrana limitans does. The determination of this point has this practical importance that while a hæmorrhage cannot readily break through the membrana limitans it can easily rupture the hyaloid membrane into the vitreous, so that the latter might thereby be injured.

There are, therefore, two groups of pre-retinal hæmorrhages which are distinguished by their position relative to the membrana limitans interna: apart from certain differences their clinical picture is on the whole similar, but (according to the results of microscopical examination) the group in which the hæmorrhage lies behind this membrane, *i.e.*, is, strictly speaking, still intra-retinal, is the one more commonly met with.

As regards the membranes limiting the retina and vitreous, v. Benedek concludes from the examination of these cases of pre-retinal hæmorrhage that in the normal condition the ends of Müller's fibres are adherent to the membrana limitans interna, which again lies next the posterior limiting layer of the vitreous. He will not admit the existence of a margo limitans interna retinæ, as described by Schwalbe, nor does he agree with Wolfrum, who from his embryological studies on the vitreous concluded that the limitans interna has no sharp definition on the side next the vitreous, and that the latter has no defined outer membrane. He is convinced, however, that the limitans interna is distinct from the vitreous and that there is a definite "posterior limiting layer" of the vitreous, as he calls it; he would discard the term "hyaloid membrane" of the vitreous as confusing. The membrana limitans being an integral part of the retina the hæmorrhages occurring behind it might be designated intra-retinal (or marginal) being comparable to those that are found in the deeper layers of the retina and produce no detachment of the limitans.

Pre-retinal hæmorrhages occur most frequently at the macula because the limitans is less adherent to Müller's fibres in this region than elsewhere owing, as Spicer has suggested, to the absence of blood-vessels at this part. They probably begin by a rupture of a vessel in the nerve fibre layer, the blood flowing in between the nerve bundles and between them and Müller's fibres and if the hæmorrhage still increases the membrana limitans interna becomes detached from the supporting fibres.

Klauber examined two eyes (taken from the same patient) in which "marginal" hæmorrhages had been seen intra vitam. The points to which he draws attention are the enormous size of the hæmorrhage, the implication of the optic disc, a regular system of folds of detached retina, and the extensive rupture of the blood into the vitreous.

The pre-retinal hæmorrhage was situated behind the membrana limitans interna which was ruptured at one part; other extravasations of blood were present within the retina over this area. The limitans interna was continued over the region of the disc as a fine but not very sharply defined layer composed of fibres of connective tissue, fibrin, and glia elements. The hæmorrhages in this case extended over the disc, although usually they end at the edge of the disc because of the firmer attachment of the membrana limitans to the glia and connective tissue of the disc. Klauber concurs with v. Benedek's view that pre-retinal hæmorrhages occur as a rule behind the limitans interna, and that the folds of detached retina are due to traction on it by that membrane as it is pressed forward, the hæmorrhage being for some reason or other temporarily checked from spreading over the surface. As to the frequency of these hæmorrhages at the macula, however, he inclines to Spicer's theory that the limitans interna is less adherent to this part of the retina owing to the absence of blood-vessels, because it was found that in some places this membrane was thinner where a superficial retinal vessel lay nearer it, as if part of it had been left on the wall of the vessel: this adhesion, moreover, would be greater where a plastic inflammation was present in or around the blood-vessel. The hæmorrhage into the vitreous was due to the rupture of the membrana limitans interna by the pressure of the blood from behind.

THOS. SNOWBALL.

BIRCH-HIRSCHFELD (Leipzig) and INOUYE (Tokyo). **Experimental and Histological Investigations in Detachment of the Retina.** *v. Graefe's Archiv*, 70, 3.

IN animal experiments it is not difficult to cause detachment of the retina by injecting sublimate, saline or iodine into the vitreous, by subconjunctival injection of cantharides, by subcutaneous injection of phloridzin, or by applying hot steam or the cautery to the sclera.

Idiopathic detachment in human beings is not comparable to the above experiments.

If the sclerotic of a guinea pig be punctured and a part of the vitreous allowed to escape, detachment of the retina will be found in very few minutes; this can be recognised by means of the ophthalmoscope. The retina is usually found to be *in situ* after a few days, but will show some lines of folding which may remain for many months. In other cases the detachment increases and may become total, usually with an opaque lens, the lens opacity commencing in the posterior cortex.

In order to investigate the various changes the following methods were adopted.

The fundus was carefully examined with the ophthalmoscope and if found normal the conjunctiva was cleansed with perchloride of mercury 1—1000 and the animal anæsthetised with ether. The needle of a sterilised syringe was then passed through the conjunctiva and sclera at about 7 mm. from the limbus and some vitreous drawn off. The average quantity removed was ·7 cc., but varied from ·4 to 1·4 cc. In some cases, in order to avoid injury of choroid and retina, the lens was extracted and the vitreous subsequently withdrawn by passing a needle through the cornea, but this method often resulted in prolapsed iris and secondary infection. After excision the eye was fixed in Zenker's fluid.

The cases are arranged in three groups; (1) In which the loss of vitreous was not followed by detachment. (2) In which detachment occurred but went back. (3) In which the detachment persisted.

Two cases from the 1st group were investigated. The retina, except for overgrowth of supporting tissue, was normal. In the vitreous were found many strands which were attached to the anterior surface of the retina.

Nine cases came under group 2. In all of these there was present thickening of the vitreous supporting fabric. The pre-retinal layer of vitreous showed in some cases such a definite condensation that it resembled a pseudo-membrane. This appearance was present equally when the puncture was made from the front. If the union of the hyaloid membrane and the retina is not very firm a detachment of the hyaloid may result, but if the union be a strong one detachment of the retina may ensue. The further course of the condition depends on whether the ciliary body can produce vitreous fluid in sufficient quantity to allow the retina to replace itself. In no single case of this series was a rent to be found in the retina, whilst in the cases of permanent detachment it was constantly present.

In considering group 3, in which the detachment persisted, the authors found attachments between the membrana limitans interna and the posterior condensed part of the vitreous. These attachments could be found a few minutes after the vitreous had been drawn off, and the authors suggest that such strands are a form of exudation from the retina. All the cases in this group (2) showed this condition.

The authors lay great stress on the condensation of the posterior part of the vitreous as a factor in the detachment of the retina. As the vitreous tends to recede from the retina, should detachments have taken place between the retina and the posterior part of the vitreous, this recession will draw the retina with it away from the choroid. Centrally the vitreous was found to be very fluid and peripherally much condensed, especially about the ora serrata.

In all the cases of persistent detachment a rent was present in the retina whereas no rent was found when the retina returned to its position. The rents varied from 1 to 20 mm. in length; they occurred in all sorts of positions but were always in the detached portion. The authors come to the conclusion that the rents were caused by some strands of attachment between retina and choroid which resisted the forward drag of the contracting vitreous strands, a tear of the intervening retina resulting.

With regard to the microscopical changes which were found in the retinal substance, Bach in 1895, after causing detachment of the retina by injecting sublimate into the vitreous of guinea pigs, found the most frequent changes in the ganglion cell layer; the cells here showed loss of chromatin network with vacuolation, shrinking and wandering of nucleus, and lastly total degeneration of the cell. He came to the conclusion that after two months recovery was impossible.

The authors found evidence of degeneration in the layer of rods and cones within twenty-four hours of the detachment. A few days later the outer nuclear layer was affected. The earliest signs of degeneration in the inner nuclear layer were found in the 7th day, and about this date also some of the ganglion cells showed early degeneration; but even as late as the twenty-ninth day most of the ganglion cells were quite intact, whereas others showed advanced degeneration. The authors agreed with Bach that recovery of function was improbable after 50—60 days.

In the later stages, 6—8 weeks, there is an overgrowth of neuroglial tissue in the retina, which lies more or less parallel with the surface but is heaped up in places to form folds.

The early degeneration in the outer layers of the retina was undoubtedly due to loss of the nutrition usually derived from the choroid. The degeneration of the ganglion cells depends probably on some other cause.

The cells of the ciliary body were found to be normal except in two cases, one of 61 and the other of 88 days standing; in these the cells were lengthened, from the dragging of vitreous strands which were attached to them.

The paper lends valuable evidence to the supporters of the shrinking vitreous theory as the cause of detachment of the retina.

A useful bibliography and some excellent illustrations accompany the text. E. W. Brewerton.

Seefelder (Leipzig). **Aniridia as a Developmental Defect of the Retina.** *v. Graefe's Archiv für Ophthalmologie*, 70, 1.

Seefelder had the good fortune to obtain, in a good state of preservation, an eyeball in which the iris was congenitally absent. Clinically the cornea had been found steamy and opaque, and its sensibility diminished; there was nystagmus, and there was some lenticular opacity. The dimensions of the eyeball were found to be somewhat large, the lens was small, and the circumlental space relatively broad. On opening the eyeball it was noticed that there was no retinal pit at the usual site of the fovea, and there was an absence of the usual pigmentation of that region.

Microscopically very little corneal change was found to account for the clinical appearance of opacity. The iris was at no point entirely absent but was represented by a short stump varying in length from 0·75 to 0·32 mm. The iris rudiment was shortest at the nasal side, where there could scarcely be said to be any actual iris. It passed backwards into the tissue of the ciliary body and forward to the termination of Descemet's membrane. It lay closely applied to the sclera at its junction with the cornea, and completely cut off the canal of Schlemm from the anterior chamber. There was no real "angle" of the anterior chamber at this point.

At the temporal side the iris rudiment was longer and had the situation of the normal iris. The angle of the chamber was free, but here also there were fine forward prolongations of the iris tissue applied closely to the sclera. The iris rudiment consisted of richly pigmented stroma and pigment epithelium. There was no trace of a sphincter or dilator muscle. The ciliary processes were poorly developed. A typical tubercular nodule and several other inflammatory foci were found in the choroid. The pigment epithelium was normal.

Throughout a considerable zone behind the ora serrata there were no rods and cones and no ganglion cells, and the retina was an almost structureless membrane. Elsewhere the ganglion cells were reduced in numbers, but in the situation of the normal macula there was a wide area in which the ganglion cell layer was notably thickened, and there was no fovea. The disc and vessels were normal. The vitreous was fluid.

The author directs attention more especially to the changes found in the posterior segment of the eye, since previous examinations of such eyes had all been incomplete or unsatisfactory in this respect. The failure of differentiation of the retina in the macular region is of special importance in the first place because it suggests an explanation for the well-known amblyopia of eyes with congenital absence of the iris. Aniridia, amblyopia and nystagmus form a hereditary triad. Albinism, amblyopia and nystagmus also form such a hereditary triad, and it is interesting to note that Fritsch has recently found absence of the fovea in an African albino. No doubt partial failures of the normal development of the macula are sometimes present.

Cataract and smallness of the lens are common accompaniments of aniridia. They probably arise from a defect of the zonule of Zinn, which is an ectodermal structure formed by the pars ciliaris retinæ.

Taking all these facts into consideration Seefelder comes to the conclusion that aniridia is not an isolated pathological fact, but one symptom of a developmental defect of the "ectodermal" portion of the retina.

The tissue which passes from root of iris to cornea and cuts off the canal of Schlemm from the anterior chamber, is the remains of a tissue which occupies the angle of the anterior chamber in the fœtus and disappears when the iris becomes developed. Its presence explains the frequent occurrence of glaucoma in eyes which suffer from congenital absence of the iris.

A. J. Ballantyne.

Emil Behse (Helsingfors). **Experimental Researches on the Action of Quinine on the Eye.** *v. Graefe's Archiv. für Ophthalmologie*, 70, 2.

The author states that Quinine amaurosis was recognised and described by several observers in the first half of the nineteenth century. Several different theories have been employed to explain the visual defect and the ophthalmoscopic signs associated therewith. Some authors have attributed the visual failure to retinal anæmia brought about by paralysis of the heart's action and fall of blood pressure. Others, among whom is de Schweinitz, assert that the poison affects primarily the vasomotor centres, the subsequent chain of events being actual changes in the blood vessels (endovasculitis), thrombosis, and atrophy of the visual tract. Another group of observers attribute the amblyopia to the direct toxic action of Quinine upon the retinal elements. All these views have found some support in the results of the post mortem examination of animals subjected to poisoning by Quinine.

Behse has conducted a series of experiments on rabbits, injecting subcutaneously a solution of Quinine bichloride. The fundus was examined by means of Schulter's ophthalmoscope.

In most cases the usual pallor of the disc and narrowing of the vessels, especially the arteries, were readily induced; but considerable differences were observed in the dosage of the drug necessary to produce these changes in different animals of apparently similar character. This corresponds with the fact of idiosyncracy observed in the human subject. Details are given of the microscopic examination of the eyes obtained from the animals treated. Briefly, it was found that when clinically the contracted arteries recovered their normal calibre no organic changes were noted on microscopic examination. In other cases with persistent contraction of the vessels, this was found to be the result of spastic contraction. In the severest cases there were actual changes in the vessel walls involving any or all of the coats, thromboses (especially in the central artery where it entered the stem of the optic nerve), and chromatolysis of the ganglion cells and the cells of the inner nuclear layer.

The author believes that the poison acts first on the vessels directly, producing a spastic contraction. This may pass off with more or less complete recovery of function, or it may persist and lead to actual organic changes in the vessel walls.

He is not prepared to express an opinion as to whether the changes in the retinal cells result from a direct toxic effect or from malnutrition secondary to the vessel changes.

A. J. BALLANTYNE.

N. BISHOP HARMAN (London). **The effects of School Life upon the Vision of the Child.** *Proceedings of the Roy. Soc. of Med.*, May, 1909.

MR. HARMAN bases his paper on the examination of 1,100 children of school age attending Hospital clinics on account of defective sight. The refraction was estimated by retinoscopy after 1 per cent. atropine ointment had been used four times a day for a week. All cases presenting evidence of injury or disease of the eye were excluded. We may therefore take the results as fairly indicating the effects of school life on the refraction of the eye. The figures are very clearly grouped by Mr. Harman and are decidedly interesting.

Dividing them first broadly into those in which the error of refraction is obviously congenital (hypermetropia and hypermetropic astigmatism) and those in which it is presumably related causally with school work (myopia, myopic and mixed astigmatism), we find that over 71 per cent. fall into the former class and under 29 per cent. into the latter; and as the children examined formed less than 10 per cent. of those attending school it appears that under present conditions less than 3 per cent. of London school children are myopic; a result which must be regarded as satisfactory when compared with Cohn's finding of something like 30 per cent. of myopic children in the schools and gymnasia of Germany.

The most important part of the statistical enquiry is that which concerns the change in refraction as the child advances in school life, and its results are extremely well shewn by the series of curves which Mr. Harman has prepared, shewing the varying proportion of the three classes of error, hypermetropia, hypermetropic astigmatism and myopia, at each year of life from six to thirteen; while the former shews a slow and steady increase, as we should expect from the tendency of hypermetropia to become more and more manifest as age increases, the figures for the other two classes shew a remarkable difference;

they run a fairly parallel course for the first five years of school life and thence diverge widely, the myopia rising while the hypermetropic astigmatism falls. "Such a phenomenon as this leads to the irresistible conclusion that the diminution of the hypermetropic astigmatism has been due to the transference of these cases to the myopic group."

Grouped according to sex the cases shew 56 girls to 44 boys, and the preponderance is in the hypermetropic class; this difference the author attributes to the boys leading a more open air life than the girls and so keeping their muscles of accommodation in good tone, and to the girls doing sewing while the boys do not, so that their eye muscles are the more fatigued; both causes tending to the more frequent detection of errors of the hypermetropic class among girls.

Other points, such as the influences of race and social surroundings, are touched on, and Mr. Harman's practical conclusions are, that while there is cause for congratulation that our cases of "manufactured" bad vision are not more numerous than they are, there is still room for improvement in the direction of closer supervision of the astigmatic children—hardly possible under present conditions—in a reduction in the amount of fine work done in school, and in a more generous provision of playgrounds and open spaces.

W. G. L.

C. G. Russ Wood. **The Treatment of some Chronic Inflammations of the Eye.** *Brit. Med. Journ.*, July 24, 1909.

The author of this paper recommends guaiacol as a more certain and less depressing diaphoretic than pilocarpine in the "combined" method of antisyphilitic treatment, which, as recommended by Burnham, consisted in daily hypodermic injections of pilocarpine while the patient was undergoing a course of mercury and potassium iodide.

He found that, while he got improvement with pilocarpine, the depression produced was so profound that although there was visual improvement, the patients sometimes refused to continue the treatment. He has tried the guaiacol method in nearly 40 cases with most excellent results; irido-cyclitis, vitreous opacities, and interstitial keratitis seeming to be the most suitable conditions for treatment.

The following is the routine he usually employs:—

The urine is examined and mercury is omitted if any albumen is found.

A mixture containing one-sixteenth of a grain of perchloride of mercury and five grains of iodide of potassium is given thrice daily, or mercury with chalk, one grain, is given in pill form, and the potassium iodide given in a mixture with nux vomica.

The patient is put to bed between blankets with two hot water bottles, then 1 drachm of a mixture of equal parts of olive oil and guaiacol is smeared, not rubbed, either in the axilla or over the epigastrium, or if this does not suffice 2 drachms, or in rare cases, 3 drachms are used, but in most cases 1 drachm is enough. The part is covered with oil silk, and a pad of wool is applied over this. A hot drink is now given and profuse perspiration begins in from 1-2 hours and lasts about 5 hours. It is difficult to make some patients perspire, and in these cases a hot bath beforehand hastens and assists diaphoresis. In one patient some irritation of the skin was produced by guaiacol, but this was practically well in a week on ceasing treatment. Generally twelve applications are made and then treatment is stopped and begun again in a few days if considered necessary. Generally the patients were kept in bed the whole time but sometimes when the application was made in the morning they were allowed to sit up at night for an hour or so.

The method of treating syphilis with diaphoretics and mercury in order to stimulate the ordinary physiological processes to activity in excess of the normal is not new, as the author points out. It has been carried out for some years with an idea of shortening the treatment. He finds guaiacol a far more certain diaphoretic than pilocarpin and that it does not produce after depression. He has not as yet tried it on any acute cases but sees no reason against doing so.

J. F. Cunningham.

FÉLIX LAGRANGE (Bordeaux). **Treatment of Ocular Tuberculosis.** *L'Ophthalmologie Provinciale*, August, 1908.

LAGRANGE in this paper discusses the treatment of ocular tuberculosis with the idea of settling the question whether active surgical intervention is called for or not. He does not deal with treatment by injections of tuberculin. Dr. Lagrange treats of the clinical records of seven cases of ocular tuberculosis which have been under his care. In four of these cases enucleation was practised, and in three no operative interference was attempted. In the first case the patient died of tuberculous meningitis which came on 17 days after the operation, but here the operation could not have been the cause of the meningitis, as from experiments in which preparations of the bacillus of tuberculosis were injected into the carotid artery of a rabbit it was found that at least a month elapsed before their action was apparent on the membranes of the brain, so in this case the infection must have taken place at least a fortnight before the enucleation. In three other cases in which enucleation was also practised the patients made a perfect recovery, and derived incontestable benefit from the radical intervention; all enjoy excellent health and that 10 or even 12 years after the enucleation, and do not show any sign of tuberculosis. They have no longer to worry about the eye, as it has been removed. Concerning the possibility of infection at the time of operation: if the tuberculosis is intraocular enucleation cannot propagate it; on the other hand partial operations are dangerous from this point of view. As regards iridectomy Lagrange has not seen any patient who has undergone that operation, but he is opposed to all partial intervention because the least mutilation of a tubercle of the iris exposes the patient very certainly to a general infection. He is further of opinion that enucleation should be reserved for cases in which all vision is abolished; if the patient retains a little vision, whether qualitative or quantitative, it is better to follow a waiting policy, and only enucleate when the eye has become an organ totally unfit to fulfil its function. Turning to three cases in which enucleation was not practised for varying reasons, the patients appear to have retained their general health, but what has become of the eye? In one case the patient has preserved a little vision, and therefore the question of operation has not to be considered. In the other cases the globe has atrophied, that is to say, they retain a small shrunken eye, painful, secreting, and a constant source of annoyance to the patients; even from an æsthetic point of view would it not be better away? Dr. Lagrange sums up the question thus:—

In tuberculous eyes in which the vision is completely abolished, the eye should be removed. This offers neither dangers nor difficulties. When the tuberculosis is enclosed in the globe one may practice enucleation; when the eye is open and there is a fungoid growth destruction by the thermo-cautery (recommended by de Lapersonne) is the procedure of choice. Expectation and non-intervention, that is to say, a well-regulated general treatment with the use of appropriate lotions, should be reserved for those cases in which some vision is still retained.

E. M. LITHGOW.

BRINTON (A. G.). **Irritation of the Trigeminus.** *Transvaal Medical Journal*, July 1908.

AFTER recapitulating the anatomical connections of this important nerve, the author instances two very instructive cases of corneal ulcers, which, after the removal of old stumps in the mouth, although there had been no toothache, healed with great rapidity, but which had previously resisted the most active treatment. The author states that in his opinion the corneal ulcers were due to the trophic influence of the fifth nerve irritated through the presence of the decayed stumps. We are, however, not convinced that a more simple explanation might not have been found in the shape of septic absorption. The paper concludes with a strong appeal for the careful investigation of all the branches of the fifth nerve in cases of obstinate headache before resorting to operative interference with the nerve itself. The author also rightly insists on the greater importance of slight errors of refraction than of those of high degree in the causation of refractive headaches.

E. E. H.

HIRSCHBERG. **La Renaissance de l'Ophtalmologie.** Translated from the German by Dr. van Duyse. Leipzig: Wilhelm Engelmann, 1908.

THIS interesting book gives as an introduction a survey of the Ophthalmology of the Greeks and Arabs. The book proper is divided into three chapters—the campaign against cataract and the controversy as to its nature, on the operation for artificial pupil, and on the extraction of cataract.

Demosthenes, in the first century of our era, formulated the first theory as to the nature of cataract of which we have any record, namely, that between the pupil and the lens an effusion arose, the coagulation of which formed cataract. The lens at that time was thought to be the seat of vision and to be situated much farther back than it actually is. In the ninth century the Arabs thought it was a membrane in front of the lens. About the year 1,000, Ammār explained that cataract was a body covered by a membrane like that of an egg. In 1543, Vasale pictured an eye with the lens situated midway between its anterior and posterior poles.

In 1600, Fabrice d'Aquapendente first figured the exact position of the lens in the human eye.

In 1656, Werner Rolfinck established the seat of cataract in the lens, thus confirming the opinion of François Quarré and Lasnier; but although followed by Morgagni, Borel, Gassendi and many others the majority of physicians and surgeons adhered to the old theory. The greatest adversary of the new doctrine was the brilliant but unscrupulous Thomas Woolhouse.

In 1700 the younger Brisseau and Antoine Maître-Jan independently published treatises describing the situation of cataract in the lens. Saint Yves, at one time a great opponent, was converted to the new theory, and besides him in France it was supported by Morand and Petit, in Germany by Heister, Huggins and Müller, in Holland by the famous Boerhaave, in Italy by Valsalva, Morgagni, Benevoli and Cocchi, in England by Cheselden and Taylor.

In 1728, Cheselden, a surgeon of St. Thomas's Hospital, first performed an operation for establishing an artificial pupil, and published a communication in the Philosophical Transactions of the Royal Society, dealing with his method of treating "Contracted" Iris with a needle. In 1711 this operation was suggested, though it was never performed, by Thomas Woolhouse.

To Joseph Beer of Vienna we owe the operation of Iridectomy; in 1798 he described a method of establishing an artificial pupil by removing a cuneiform segment of iris.

The operation of Iridencleisis, the incarceration of the iris in a corneal or scleral wound was adopted by Adams, Himly, Critchett and Pagenstecher, but was discontinued on account of sympathetic disease arising.

To Jacques Daviel belongs the honour of introducing the operation for Senile Cataract. The operation had been suggested by Steven Blankaart in 1688 and employed by Saint Yves and Petit for lenses dislocated in the anterior chamber. Daviel's first publication appeared in 1748, but his chief communication was made to the French Academy of Sciences in 1752. The section in his earliest operations included the lower two-thirds of the cornea, the wound being commenced by an instrument very much like a Keratome and completed with curved scissors. The corneal flap was turned upwards and the lens capsule incised with a needle. The lens was expressed by pressure with the fingers on the lower lid. Daviel later reduced his section to include only one-half of the corneal circumference.

A reaction against the new operation set in, headed by Percival Pott, and many surgeons reverted to the old operation of displacement. Finally the new operation was thoroughly established by Beer, Jäger, Rosas, Fischer, Arlt and Hasner in Austria, and by Sichel and Desmarres in France.

In 1866 von Graefe made known his peripheral linear section with Iridectomy, and in 1885 De Wecker introduced the simple extraction of cataract.

We have read this book with great pleasure and can recommend it to all ophthalmologists. The regrettable feature in the Renaissance is that English Ophthalmologists did not play a greater part in perfecting operative methods.

Dutoit (Burgdorf). **Index to the Articles dealing with Ophthalmology in the Correspondenzblatt fur Schweizen Aerzte from 1871 to 1908.**

We are not sure that as many of our readers as would profit by reading it are in the habit of seeing that useful and up-to date journal, the *Correspondenzblatt für Schweizen Aerzte*; it is the equal of most general journals and superior to some. It frequently contains very useful and practical papers on subjects connected with ophthalmology which might with great advantage be studied by surgeons in this country. To facilitate reference, Dr. Dutoit has undertaken and carried out the stupendous task of indexing the "eye" papers in the Journal from 1871 onwards, and his work should be highly appreciated by any who desire to "hunt up" references to the writings of some of our most distinguished Swiss *confrères*.

CLINICAL AND THERAPEUTIC NOTES.

Ophthalmia from Marjoram.

Some persons are peculiarly susceptible to the action of Primula obconica and certain Chinese primulas; such cases were described by White in England in 1887. Later, other plants were found to have similar irritating properties, either in their leaves or juices, particularly upon the skin, *e.g.*, Eucalyptus, Rhus, Chrysanthemum indicum, etc.

This year (Hilbert (Sensburg) came across an interesting case of skin and conjunctival irritation in a youth of 16 years, a gardener employed in making up bundles of Origanum Marjora L. (the common Knotted Marjoram of England) for the market. During the course of the work his face and hands began to smart, and the eyes pricked and discharged. Hilbert saw the lad the same evening, and found a marked erythema of the parts, and a profuse mucoid secretion from the eyes, with a good deal of blepharospasm. The boy acknowledged that he frequently buried his face in the herb to enjoy the fragrant smell.

For treatment heroic measures were avoided; he merely smeared lanoline over the affected skin, and applied cold compresses to the eyes, with the result that the irritation speedily subsided. To make sure that the suggestion of cause and effect was a true one, when the lad was quite recovered he rubbed one finger with some of the freshly gathered herb: almost immediately the skin became red, and, later, swelling appeared.

He remarks that country people sometimes use an ointment of the herb which not infrequently produces marked irritation of the skin. Planz published some cases of this nature in Rostock in 1905. In Lloyds' Encyclopædic Dictionary (1895) I find that the herb is used by farriers as a blistering agent.

Proceeding to discuss the manner in which the herb acts, Hilbert says that plants irritate in three ways: (1) some possess sharp oxalic crystals, like the Scylla maritima L.; (2) others spines with formic acid, like the nettle; (3) others, like the marjoram, are delicately soft plants but contain essential oils which are irritating to susceptible persons.

Wochenschr. f. Ther. u. Hygiene des Auges., Feb, 1909,

N. B. H.

A NEW FORM OF DIONINE.

Sylla, of Bremen, has strongly recommended a new form of dionine, an æthylmorphin hydroiodicum, instead of the older form, an æthylmorphin hydrochloricum. He stated that the change of the acid radical from chlorine to iodine produced a salt which was much less painful in action, and more effective in that it was more soluble.

Arlt (Vienna), in this paper, examines these claims. He concedes that the iod-dionine is almost painless, but his experiments show that it is much less soluble than the chlor-dionine.

He has made experiments with many drugs to ascertain the influences that control their solubility, particularly when the solid drug is applied direct to the conjunctiva. He drags the lower lid away from the globe and applies the powder to the lid, keeping it from contact with the globe. He finds that three factors influence the solubilities: (1) the quantity of tears; (2) the amount of sodium chloride in the tears; and (3) the amount of albumin. The first content is the more important. In laboratory experiments he finds that a 1·5 per cent. solution of common salt will take up dionine more rapidly than a 0·5 per cent. solution.

Comparing the two salts of dionine, he found that a 1·5 per cent. solution of common salt took up a given quantity of chlor-dionine in 9 minutes, whilst the like quantity of iod-dionine was still undissolved in an hour, notwithstanding constant stirring.

Arlt proceeds to discuss the virtues of the old dionine and gives the following case:—

A woman of 57 years, whose corneæ were grossly scarred from the effects of trachoma and operations intended to relieve the condition, had only vision of $^5/_{120}$. He applied 10 per cent. dionine once a week for five weeks. Each time there was an enormous reaction lasting 24 hours. At the end of the period the vision reached $^5/_{30}$, later $^5/_{20}$ and $^5/_{18}$.

Wochenschr. f. Ther. u. Hygiene des Auges, May, 1909.

N. B. H.

IRRIGATION OF THE ANTERIOR CHAMBER AFTER CATARACT EXTRACTION.

By N. Bishop Harman,
M.B., B.C. (Cantab.), F.R.C.S. (Eng.)

The account of the advantages to be obtained by the irrigation of the anterior chamber, after cataract extraction or iridectomy, given by Major R. H. Elliot at a recent meeting of the Ophthalmological Society of the United Kingdom,* was so glowing that I was anxious to see the operation in use at the source of its origin.

During the recent meeting of the British Medical Association at Belfast many ophthalmic surgeons had the opportunity of seeing Dr. Killen put in practice the methods of M'Keown. In a cataract extraction on an old man he practised both methods of irrigation advocated by M'Keown: (1) The initial irrigation of the cataractous lens by means of a hypodermic needle attached to the tube of an irrigator and inserted, through the corneal incision, beneath the capsule of the lens. (2) Washing out the fragments of the lens remaining within the anterior chamber after the extraction.

By the first operation I was not greatly impressed. The lens was a mature senile cataract, and the irrigation beneath the capsule, preceding the use of the cystitome, seemed to me to be an unnecessary complication and of doubtful utility. Maybe the method would be of service in a case of immature cataract.

Of the second operation, the washing out of the débris of the lens after extraction, my impressions are of the liveliest and most happy order. No words seem too glowing to describe the beautiful simplicity with which the gentle stream of water let into the anterior chamber carried away in its regurgitation the cloudy remnants that obscured the pupil. In a moment the gray cloud of débris was swept away and a clear black pupil remained. It was a result far beyond the capacity of the most delicately handled curette. The statement of Elliot " it appears to me to be the one important step in advance made recently in the treatment of cataract " seemed fully justified.

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* Vol. xxix, 1909, Fasc i, p. 71.

There was one point of procedure which appeared to me unnecessarily complicated. The original apparatus devised and used by M'Keown was shown us by Dr. Killen; it was confessedly too complicated for general use. The irrigator used by Dr. Killen had the advantage of lesser complexity, but even so it was a huge piece of apparatus for so simple a procedure. It could be used in an eye hospital where are a squad of well trained assistants and nurses; but what use would it be in a general hospital with its ever changing personel, or in private with no help save the family doctor and a general nurse?

In some of the instrument catalogues I have seen figured an india-rubber ball fitted with a nozzle to be used in this irrigation; it was devised by Wanless of the I.M.S. There seem, theoretically, to be drawbacks to the use of such an apparatus: the pressure of the ball must be an uncertain quantity, and it would seem that the use of a comparatively short nozzle with the rubber ball directly attached to it tended to obscure the surgeon's view of what was happening.

Since seeing Dr. Killen at work I have used irrigation at hospital and in private to my complete satisfaction. The irrigator was made up from materials that every eye surgeon will have at hand. The reservoir was a 100 cc. Schuster's drop-bottle, a small short-snouted "Undine" of Moorfield's fame. Part of the snout was cut off to enlarge the orifice. A six-inch length of rubber tubing connected this with a nozzle belonging to an Anel syringe of ancient pattern. The nozzle is 28 mm. long; 5 mm. from the end it is bent to an angle of 45° degrees with the stem; the orifice is slit-shaped, 2 × 0·5 mm. What this particular nozzle was originally designed for I cannot guess, but for irrigation of the anterior chamber it seems ideal. The shortness of the nozzle is a point of value, for during the irrigation one's hold of it is mainly by the rubber tubing, so that a sudden movement of the eye merely displaces the nozzle without pressure upon or injury to the eye.

When the reservoir is raised the length of the tubing above the nozzle a smooth stream of water is ejected 1 to 2 inches in the horizontal, giving a wash ample for the purpose.

The whole apparatus can be boiled in the usual pattern sterilizer.

The preparation of the normal saline solution may be thought to present obstacles where it has to be done practically single-handed. With a reservoir of known capacity the process is simplified; the addition of 14 grains of kitchen salt to 100 cc. of water, the capacity of my undine, gives a normal saline solution. The juxtaposition of "grains" and cc. looks unscientific, but "14 grains" is easier to remember and weigh out than a fraction of a gramme! The fluid can be boiled in the undine, the thin glass of which will stand the direct flame of a spirit lamp. Then the vessel is put to stand in cold boiled water until it feels just too hot to the hand, at this point a clinical thermometer is slipped into the mouth of the undine and the run-up of the mercury watched. If it begins to rise with a rush the water is too hot; the undine is resteeped and shaken in the cold water and the temperature re-tested until 99°F is marked. That is a safe point to stop at, for the water loses slightly in heat in its flow down the tube.

The beauty of M'Keown's irrigation is such that I am sure it must appeal to every surgeon who sees it used, or tries it for himself.

RECLINATION OF CATARACT.

By Somerton Clark, F.R.C.S.E.,
Mission Hospital, Dera Ismail Khan, India.

Much has been said and written against the practice of couching the lens, indeed one writer describes the ultimate consequences of the operation as being as melancholy as the immediate result was brilliant.

Every ophthalmic surgeon in India has seen eyes ruined by the hakim's couching, and some of us have removed the lens with success after it has been dislocated by the hakim.

The hakim's results are not always so bad as is supposed. This is shown by the following case:—

Malik Gulam Mohammed, headman of a Frontier village in this district, was afflicted with double cataract in 1905. His age was 64. He sent for an hakim who lived 200 miles away. When the hakim came, the headman changed his mind and declined operation. The hakim operated on two poor men successfully.

The headman came to me and, as I advised operation, he went to a surgeon of great experience and regained his sight in his left eye. A year later the hakim again visited his village and, as the sight of the two men on whom he operated had remained good and they had no pain, the headman requested the hakim to operate, which he did for fees amounting to Rs. 70 (£4 13s. 4d.). The patient during the operation sat up and the needle was introduced on the nasal side of the right eye. No drug was administered. Pain was felt at the time of the operation and afterwards. The actual cautery was applied to the temple, and the eye was then bandaged for 10 days. On the fifth day severe pain was felt in the forehead and the part was blistered but the pain was not relieved. When the bandage was removed he could see. In 1907 he came to me and was operated on for entropion.

On February 28, 1909, he again came to me for spectacles to enable him to read. He stated that the right eye, on which the hakim had operated, was more useful for distant sight and the left for reading.

With the right eye he counts fingers at 3 yards, and with the left at 4 yards. With +10D, RE $V = {}^{6}/_{18}$, LE $V = {}^{6}/_{18}$. He accepts +14 D for reading.

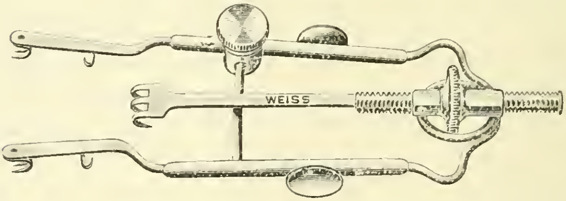
The dislocated lens is easily seen; it lies to the lower part of the temporal side and diminishes the temporal field of vision. As the patient looks to his right the lens closes the pupil, when he looks to the left the lens disappears from view. When he looks straight in front the lens looks like a moon twenty-two days old.

Examined by oblique illumination—the pupil is seen to be pear-shaped with point to the nasal side. From the point to the circumference of the iris there is a grey scar slightly curved. In the left eye the iris is normal, the simple operation having been performed.

The patient complains of slight lacrimation of the right eye. Erythropsia has not been noticed.

A NEW RETRACTOR FOR USE IN EXCISION OF THE LACHRYMAL SAC.

By N. Bishop Harman.



Some form of retractor is almost a necessity in performing the operation of excision of the lachrymal sac. First, to open out the incision, which is awkwardly situated in a narrow place betwixt the inner canthus of the lids and the side of the nose. Secondly, because efficient traction on the tissues provides the best means of checking bleeding. At present Müller's and Axenfeld's tractors are the most generally used. Müller's is neat and convenient in form, but not sufficiently powerful as a hæmostat; Axenfeld's is large and clumsy, but very efficient as a hæmostat, yet it has a serious drawback in that its large claws drag the wound open vertically, and the upper claw is greatly in the surgeon's way in removing the upper-cul-de-sac of the main sac, the complete removal of which is essential to the success of the operation.

The instrument shown in the cut combines the actions of these two forms of retractors. The frame is that of Müller, and it is no larger than his neat model. But, by an alteration of the prongs at the extremity of the laterally acting blades, and the addition of a claw (something like an old-fashioned "back-scratcher") which can be drawn back by the milled nut at the spring end of the frame, this retractor will exert the powerful tractor action of Axenfeld's instrument, and yet leave the upper end of the site of the operation free. In inserting the new retractor the instrument should be first closed, the blades approximated, and locked by a turn of the side check-screw and the long claw pushed home to just behind the side prongs of the lateral blades. The claws are inserted into the wound just as in using Müller's instrument. Now the side check-screw is released, and the blades, being forced apart by the spring of the frame, stretch the incision laterally; the side check-screw should now be firmly locked. The blades are then gently pressed into the wound by one finger, and the milled nut at the spring end of the frame turned so as to draw back the long claw: the front claws on the blades are pivoted and so shaped that they oppose the backward drag of the long claw, so that the incision is stretched tight. The field of the operation is well exposed, and the traction exerted on all sides of the wound acts as a most efficient hæmostat, yet the important upper limit of the wound is left quite free of any obstruction that would hinder the work of the surgeon.

The instrument is made in excellent fashion by Messrs. John Weiss & Son Ltd., 287, Oxford Street, London, W.

REVIEWS.

CAPT. OXLEY, I.M.S. **The Complete Removal of Cataract (Smith's Operation).**

CAPT. LISTER, I.M.S. **Extraction of Cataract in the Capsule.**

CAPT. MCKECHNIE, I.M.S. **Notes and observations on the Operation of Extraction of Cataract in the Capsule.**

CAPT. GIDNEY, I.M.S. **Extraction of Cataract in the Capsule.**

R. JAMISON (Belfast). **Extraction of Cataract in the Capsule.**

MATHRA DAS (India). **Extraction of Cataract in the Capsule.**

THE papers of which the titles are given above, were presented to the Bombay Medical Congress in the early part of this year. They are written by operators who have had considerable, and sometimes extensive, experience of removal of cataract in the capsule. All the writers are strong supporters of this method of operating, and with the exception of Gidney confine themselves to reports of series of cases and to descriptions of the difficulties and complications met with in their experience.

Captain Oxley, who is Civil Surgeon at Seoni, reports 378 intra-capsular operations; in this series there were 9 failures: "6 closed pupils from iritis and 3 suppurations." Loss of vitreous occurred in 27·3% of the cases. The visual results in 100 of the 378 cases are given: these cases were not selected but included all Oxley had been able to follow up for periods varying from 3 months to 3 years. Of this number 52 had v. $^{6}/_{6}$ to $^{6}/_{8}$; 26 had v. $^{6}/_{10}$ to $^{6}/_{15}$; 9 had v. $^{6}/_{20}$ to $^{6}/_{30}$; 13 had v. below $^{6}/_{30}$, of which v. was *nil* in 6 instances and "indifferent" in 7.

Captain Lister states that his experience is based on 576 cases, most of which he operated upon at the Civil Hospital, Jullundur, where he worked under Major Smith. In two cases the eye was destroyed by suppuration; in two others suppuration occurred "at the site of the wound"; one of these cleared up without after-effects; the other patient left the hospital on the 11th day, and the after history is unknown. Lister omits this last case in calculating his percentages of suppuration, but even if it be included the figures are only 0·52. Escape of vitreous occurred 29 times, but in two cases the lens had been previously couched by a native "Coucher." No definite visual results are given; the difficulties of obtaining such figures, in India, are known to be almost insuperable, but Captain Lister can scarcely expect readers to accept without reserve his conclusion "that the *average* vision obtained after this operation provided the eye was healthy before operation, is $^6/_6$," unless supported by the results of tests.

The title of Captain McKechnie's paper is somewhat misleading. His "notes and observations" as far as the operation under discussion is concerned, are meagre. He gives a description of the daily routine at the hospital at Jullundur, and eulogises Major Smith's skill as an operator and his kindness as a teacher. McKechnie's experience of the intra-capsular operation extends to over 500 cases, but he gives no details of his cases, merely stating that the results were "much better than he could have hoped to attain by any other operation"!

Captain Gidney's paper is a long and interesting one, in which he discusses the advantages and disadvantages of the intra-capsular method of extraction. He does not consider this operation "a panacea for all forms of cataract," recognising that there are limitations to its application. Referring to the prevalence of cataract in India, he states that operation for this disease "forms about one-third of the total selected surgical operations, and the number of extractions average about 20,000 annually." Gidney strongly advocates extraction in the capsule, and he especially emphasises its superiority over all other methods in dealing with *immature* cataract. His experience in 100 cases of immature cataract, extracted in the capsule, is given in a table, and shows under "visual results," successful 91, partial success 8, failure 1. (The classification adopted is as follows: "Success" indicates vision of at least $^6/_{36}$; "partial success" means vision of less than $^6/_{60}$; "failure" indicates p.l. only.) Gidney compares series of cases previously published, after operation by the intra-capsular and the capsule-laceration methods. Comparing Herbert's and Smith's results, he shows that in 1,262 capsule-laceration operations, Herbert had 92·1% successes, 6·2% partial successes, 1·7% failures: in 2,616 intra-capsular operations Smith had 99·27% successes, 0·38% partial successes, 0·34% failures. In another table, which includes operations by four surgeons of each school and concerns a larger number of cases, the percentages differ less widely, and the average of successes is lower in each table. The balance is, however, in favour of the intra-capsular method, by which 87·12% of successes was obtained, as against 82·07% in the capsule-laceration method.

Gidney discusses, at some length, loss of vitreous during extraction of cataract. In common with all those who have had a large experience of the intra-capsular operation he does not consider escape of vitreous, unless it occurs in large quantity, a serious complication. He shows by figures that the percentage of vitreous escape is about 7 times higher in the intra-capsular than in the capsule-laceration operation. Yet the same series of cases show that intra-capsular extractions have a percentage of successes which is better by 5%, and a percentage of failures which is lower by 0·5%, than those obtained by the capsule-laceration method.

His own results in 811 intra-capsular extractions (unselected) are 11·50% of escape of vitreous.

Jamison's paper is a record of the results obtained by him in 260 cases, operated upon under the personal supervision of Major Smith. Jamison states that he was "an absolute beginner at cataract extraction by any method," and as such he has good reason to be satisfied with his results. Much of the paper deals with the duties of the assistant, and with details of technique, all of which has been already and better described by Smith and other operators of great experience.

Mathra Das, a hospital assistant, another pupil of Major Smith, has operated upon 1,653 cases of cataract by the intra-capsular method, with "95%" of successes. He gives details of his last 162 cases. In this number there were 4 failures: there were no cases of suppuration. In 14 cases loss of vitreous occurred, but of these good vision was obtained in 12. Visual results are not accurately recorded, but are reported to be good in 158 of the total number. His successes during the years in which he adopted the laceration of capsule method were 86%.

J. B. L.

V. B. NESFIELD (Assam). **Extraction of the Lens in its Capsule by Division of the Suspensory Ligament.** *Indian Medical Gazette*, July, 1909.

CAPTAIN NESFIELD appears to have found practicable the modification of the operation for extraction of the lens in its capsule above described.

His communication would have been much more convincing had he given us his clinical facts, but in view of the great interest of the subject we give his description of his method of operating *verbatim*.

After remarking that he has found Smith's operation difficult, and, moreover, dangerous, as a persistent attempt in a stubborn case leads to escape of vitreous, he continues:—

"To overcome this difficulty, latterly, I have divided the suspensory ligament and the results have been excellent.

"Having made the incision and done the iridectomy, a cystotome is passed between the iris and the lens till its point is well beneath the iris and beyond the circumference of the lens in its capsule. The instrument, which has been passed with its cutting point directed outwards, is now turned so as to divide the suspensory ligament. The point is swept round the circumference of the lens so as to divide the inner, lower and outer portions of the ligament. The cystotome is then again turned so that its point may look side ways and escape damaging the capsule. It is now carefully removed.

"The lens with its capsule will now be found to be free on three sides and a very little pressure will deliver it.

"But, should the upper and remaining portion of the ligament still offer a dangerous amount of resistance to the delivery of the lens in its capsule, then the presenting 'cataract' should be grasped with the fixation forceps. This ruptures the capsule, the greater portion of which is carried away in the forceps while the lens is very readily delivered."

W. G. L.

WISSMANN. **The Influence of Artificial Digestion on the Specific Characters of Lens Albumen.**

BÖRNSTEIN. **Ingested Lens Albumen as Antigen.** *v. Graefe's Archiv für Ophthalmologie*, 71, 1, July, 1909.

IN an introductory note to these two papers Schirmer explains that the researches were undertaken at his instigation to determine the behaviour of lens albumen submitted to digestion, as to whether it is absorbed unaltered or whether it loses its *specific* character in the process. The interest of the question lies in the fact that Römer has attempted to prevent the development of senile cataract by the administration of lens albumen with the object of attaching to it the lens cytotoxins which he supposes to be circulating in the blood. If this is to happen it is necessary that the lens substance after digestion should enter the circulation without having lost its specific properties.

The object of Wissmann's research was to determine whether the digestion *in vitro* of lens substance (Antigen) deprives it of its power of combining with lens precipitin (Antibody) in the blood serum.

By the intraperitoneal injection of a lens extract in rabbits he obtained a serum rich in precipitin. Against this he tested lenses which had been digested with pepsin, or trypsin, or both, and found that even long continued digestion did not destroy the precipitinogen.

Various attempts were made to separate by physico-chemical means the coagulable albumen of the lens. It was invariably found that when the resulting fluid gave the precipitin reaction it also contained coagulable albumen. The precipitin reaction is therefore always associated with the presence of coagulable albumen.

In Börnstein's research rabbits were fed on ox lenses. After six or seven weeks feeding their serum gave the precipitin reaction when tested with lens extract. From the large dose of antigen employed (one or two ox lenses per diem) the author concludes that the precipitin formation was due to the absorption of albumen which had escaped digestion.

In a second series of experiments on cats no precipitin reaction could be obtained even after eleven weeks, and deviation of the complement also gave a negative result.

As a third experiment the author fed himself for 80 days (one ox lens daily) and again found no evidence of the formation of lentibodies. He concludes that lens albumen taken by the mouth loses its specific characters in digestion.

A. J. Ballantyne.

ROCHE. **A Case of Double Electric Cataract.** *Annales d' Oculistique*, June, 1909.

CATARACT which is caused by the discharge of an electric current is very rare. The author's is the fifth case on record: and it is especially distinguishable by the fact that, so far, it is the only one in which each lens in the patient became cataractous. The etiology is difficult to determine: many theories have been advanced to account for it. Himly attributes the affection to intensity of light; Yvert believes that it is due to rupture of the anterior capsule; Lebert holds that the current sets up a catalytic action which results in coagulation of albumen; Vossius that cataract follows an iridocyclitis produced by the current; while Hess has caused experimentally cataract in the frog by means of a current from a Leyden jar, and investigation afterwards showed that the lesion present was more or less destruction of the epithelium of the anterior capsule. In the author's case this was the condition which seemed to be present. In the lens which was extracted hardly any opacity was apparent, but the anterior capsule was so opaque and thickened that after the extraction the cataractous appearance was just as marked as before. The author points out that his case is only the second one in which operative interference has been undertaken for the relief of electric cataract. PERCY DUNN.

EDGAR S. THOMSON (New York). **The Formation of Pupillary Membranes after Cataract Extraction.** *Archives of Ophthalmology*, May, 1909.

THE author holds that these membranes are due to: (1) Unremoved cortex from the equator of the lens enclosed by apposition of the posterior capsule with the remains of the anterior capsule, and so protected from the solvent action of the aqueous; (2) Connective tissue formation from iris fibroblasts due to iritis, slight or severe.

The unremoved cortex invariably increases in volume by proliferation and may become infiltrated with leucocytes and fibroblasts. Later the mass undergoes retrogressive changes, resulting in connective tissue formation and contraction. These contraction bands, hidden behind the iris, exist very frequently. They do not necessarily give rise to trouble, perhaps because the changes are slow, and our patients often old, but they may (1) Pull on the ciliary body causing those apparently spontaneous attacks of cyclitis which occur with a clear pupil, and which even go on to glaucoma; (2) Relax the membrane so that it wrinkles, and causes irregular refraction of light rays; (3) Form, when accompanied by slight iritis, the well-known connective tissue membranes of varying density across the pupil.

To counteract the above, he advocates making as large a crucial incision with the cystotome as possible, to expose the cortex thoroughly to the aqueous; washing out the capsule after every extraction; and controlling inflammation of the iris as far as possible by the early and judicious use of ice and atropine.

His after treatment of the opaque membranes is on the usual orthodox lines. But he points out that it is advisable not to judge the density of the membranes only by the appearance, but to consider also the amount of iritis that followed the extraction, the amount of cortical material that was left to be absorbed, and the length of time since the extraction.

In reviewing this monograph, it only remains to point out, first, that the large cruciform incision leaves two triangles in the upper segment with a natural tendency to prolapse, or to become adherent to the wound giving rise to irido-cyclitis or glaucoma; and secondly, that the author ignores Dr. Bates's work on the evacuation of the anterior chamber in rabbits, and its refilling with a fibrin-forming aqueous. If Dr. Bates's results apply equally to the human subject, then it would seem as important, for the prevention of after-cataracts, to avoid the frequent emptying of the aqueous as to remove thoroughly the anterior capsule.

P. C. Bardsley.

Igersheimer (Heidelberg). **The action of Atoxyl on the Eye.**

v. Graefe's Archiv für Ophthalmologie, 71, 2.

The author of this paper has analyzed 37 cases illustrative of the disastrous results which may in some cases accrue from the administration of atoxyl, and has followed up his observations by experiments on animals designed to demonstrate as far as possible the mode of action of the drug on the different tissues of the eye. In the human subject a peculiarly malignant form of optic atrophy is found to occur, the usual clinical course of the case being as follows: some weeks or months, but occasionally only a few days, after the beginning of atoxyl treatment disturbances of vision set in in the form of flashes of light, mist before the eyes, and deterioration of vision. These phenomena may occur as the only symptoms of intoxication; more often, however, they are accompanied by others, particularly muscular weakness, mental depression, giddiness, noises in the ears, and actual deafness. The ophthalmoscopic picture at this stage may be absolutely normal, and direct vision is often not appreciably affected; on the other hand there is almost without exception some contraction of the visual field. In other cases there may be observed a slight pallor of the optic discs, either uniform or limited to the temporal side: a central scotoma has never been demonstrated at any stage in the affection. The process always affects both eyes, but not necessarily with equal severity. Failure of direct vision and concentric contraction of the field now develop rapidly, with the establishment, in some cases early, in others late in the affection, of total primary optic atrophy, the discs being sharply defined and the retinal arteries frequently greatly contracted. The pupils often exhibit a prompt reaction to direct illumination for a surprisingly long time, but usually become wide and inactive to light when the optic atrophy has been for some length of time established. In very exceptional cases the amblyopia may occur under the guise of a retrobulbar neuritis and may remain stationary.

The prognosis is in the highest degree unfavourable, as the pathological changes having once set in usually progress in spite of immediate cessation of the drug to complete amaurosis, no treatment being found of any avail. Eyes which have suffered from more or less latent intoxications appear to be especially susceptible to atoxyl poisoning. Thus many of the recorded cases were alcoholic, while two had been under prolonged treatment with arsenic. In another case a physician five years after a doubtful syphilitic infection developed a unilateral paralysis of accommodation, and four years later double central scotoma. As in spite of mercurial treatment the failure of vision slowly but surely progressed five injections of ·5 g. of atoxyl were given in 10 days. The vision at once became noticeably worse and in 8 days the patient was almost completely blind. Severe toxic symptoms seem to be especially liable to occur when the drug has been administered in small doses daily, and when in weekly administrations the individual doses have exceeded ·4—·5 g.

In the only post-mortem examination made in the human subject there was evidence of degeneration in the fibres of the optic nerves, the changes being most pronounced in the neighbourhood of the chiasma.

The author's experiments on animals led him to the conclusion that the nervous tissues of the inner and outer layers of the retina and of the optic nerve possess a special affinity for the atoxyl-molecule, which may become anchored to one or more of these tissues. In cats gross changes were also produced in the spinal cord and brain, being most evident in the optic thalamus. The pathological changes appear to be due usually to the action of either the drug itself or a still more toxic reduction product: in very chronic cases, however, associated with symptoms of peripheral neuritis and retrobulbar neuritis, it seems probable that the inorganic arsenic component of the drug is responsible for the symptoms.

A. C. Hudson.

Snydacker (Chicago). **On the Differential Diagnosis between Headaches of Ocular Origin and those due to Inflammatory conditions of the Nasal Accessory Sinuses.** *Klinische Monatsblätter f. Augenheilkunde*, June, 1909.

After referring to the interesting discussion which has recently been conducted in the *Monatsblätter* on "The relation of Oculists to the Operative Treatment of the Nasal Sinuses," the author gives a statistical survey of 2,000 of his private cases, amongst which he found 799 patients who had applied for treatment complaining of headache. Amongst this latter series were 55 in whom the headache was found to be entirely attributable to either acute or chronic empyæma of the accessory sinuses of the nose. The real origin of the symptoms in some of these cases he did not at first diagnose, and he suggests that there are many instances where the oculist may overlook the true source of troubles which at first sight appear referable to some disability of the eyes and for which the patient seeks his aid.

The greater proportion of these cases he maintains will be found to be dependent on inflammatory affections of the frontal sinus alone or combined with a similar condition of the anterior ethmoidal cells; it is only infrequently, he says, that empyæma of the maxillary sinus or of the sphenoidal sinus comes under the notice of the oculist, as affections of these cavities do not usually produce symptoms referred to the eye.

With these data before him Snydacker submits that the oculist should have some knowledge of rhinology, not so much in order that he may undertake the treatment of such cases, but rather that he may be able thereby to transfer them to the care of the nasal surgeon or summon him in consultation when difficulties in diagnosis arise. To this end some rules for guidance are given, of which the following is a short abstract:

(1) Every headache limited to one side, not being of the character of migraine, should excite suspicion in this direction, especially if it can be accurately localised. Although pain from an inflamed sinus may be referred to other situations it is generally the case that the area immediately over it is tender when one of these cavities is occluded.

(2) The oculist should always test the sensitiveness of the frontal and supra-orbital regions when the patient complains of headache, as under these circumstances the frontal sinus is often at fault.

(3) All headaches which appear to date from an attack of influenza or severe cold should cause the oculist to suspect the nasal sinuses.

(4) In the case of a headache which comes on suddenly and is pulsating in character the nose should be submitted to examination.

(5) A headache which recurs periodically should occasion careful investigation into the condition of the nose, especially when it usually begins on rising in the morning, lasts a few hours and gradually decreases in severity, disappearing altogether in the evening. Such headaches are often due to frontal sinusitis, and the explanation of these phenomena lies in the fact that the natural ostia of this sinus are in the most dependent position when the head is upright, thus favouring the discharge of any pathological products, whilst drainage ceases when the patient is recumbent.

(6) If the oculist has good reason to suspect the headache to

be caused by some nasal lesion he should make careful enquiries as to the presence of any nasal discharge and particularly as to whether such, if present, is limited to one side. The discharge may occur anteriorly and necessitate the use of many handkerchiefs daily, or be complained of as accumulating in the back of the throat. Further, if the oculist himself wishes to make an examination of the interior of the nose, improvement of the symptoms after the intra-nasal application of adrenalin points to the headache having a nasal origin, whilst transillumination and radiography will both at times be of assistance in establishing a correct diagnosis. Whether or no the oculist should adopt these methods of examination is a matter, Snydacker considers, for each himself to decide.

He concludes with a reiteration of the kind of headaches which he states may be regarded as possibly arising in connection with the nose, and once more draws attention to the great interdependence which exists between Rhinology and the special practice of medicine and surgery in relation to the diseases and affections of the eyes.

Though only a short outline of the subject, the article is good and makes one wish that a more exhaustive treatise might be written on these lines by the collaboration of two or more surgeons representing both specialities, whilst if the views and experience of the dentist and aural surgeon were also embodied it would form an extremely valuable work. It is rather surprising that more attention is not directed to the influence which disease of the sphenoidal sinus has in the production of symptoms and signs apparently connected with the eye, since, although sphenoidal sinusitis may be uncommon, lesions of this portion of the nose can give rise to extreme and serious ocular disturbances. It is also perhaps a little unfortunate that the author has limited himself to discussing the effect of the accessory sinuses alone, as one of the most common causes of headache referable to intra-nasal sources is a simple enlargement of the anterior end of the middle turbinal, unassociated with any affection of the neighbouring sinuses, but engaging more or less permanently the nasal septum, and that just at the point where this structure is most sensitive and least tolerant of irritation.

One is glad to find that emphasis is laid on the fact that in headaches arising from affections of the nose the symptoms are often described as being worse the first thing in the morning and improving later on in the day. Some patients suffering in this respect will even state that they wake with the headache or are woken by it, and although the author rightly assigns as a reason for this state of affairs the recumbent position and altered relation of the ostium to the cavity in the case of the frontal sinus, the same cause will also intensify headaches due to most other nasal affections.

It is also gratifying to read that Snydacker does not despise making use of radiography for assistance in arriving at a diagnosis in cases of nasal sinusitis, for this certainly at times constitutes a valuable aid in supporting other clinical evidence.

He urges that the sensibility to percussion should always be tested when the frontal sinus is suspected, taking care to use as nearly as possible the same degree of force; this method, however, is liable to introduce a considerable amount of error and greater accuracy of comparison may be obtained by placing the two thumbs along the side of the patient's nose with the tips immediately beneath the inner portions of the frontal sinuses, and then instructing the patient to lean or press the head forward on them. In this manner, as nearly as possible the same amount of pressure will be exerted on each side.

As has been said the article is well worth reading and should be used as a reference in the compilation of other work on this subject.
ALEX. R. TWEEDIE.

W. SCHÜSSELE (Baden-Baden). **A Contribution to the knowledge of mild Metastatic Inflammations in the Eye due to Streptococcic Infection.** *Klinische Monatsbätter für Augenheilkunde*, July, 1909.

WHILE it is generally accepted that in purulent inflammations of the eye conveyed through the circulation there is always a deposit of the bacteria in that organ, *i.e.*, a true metastasis, the nature of the mild non-suppurative inflammations (apart from lues and tuberculosis) has not been so fully studied, as they have been much less frequently the subject of bacteriological examination.

It has been proved that the micro-organisms of suppuration may give rise to small foci of inflammation in the eye which disappear, as in the case in which Axenfeld and Goh demonstrated the presence of small clumps of pneumococci in the choroid and retina of a patient suffering from chronic septicopyæmia. In puerperal septicæmia, the streptococcus is highly dangerous for the eye, leading, as it generally does, to phthisis bulbi if not directly to panophthalmitis. But this is not always the case. One may recall the work done by Poynton and Paine, who succeeded in isolating a streptococcus from the blood of a patient who had rheumatic fever, and in setting up a mild iridocyclitis in a rabbit through the circulation. Schüssele too has observed a case of chronic streptococcic septicæmia with a mild metastatic inflammation in both eyes.

The patient was an army officer, 40 years of age, with a good family and personal history; he contracted articular rheumatism, which was followed by symptoms of cardiac weakness. Severe endocarditis with prolonged rise of temperature supervened upon repeated attacks of "rheumatism." A bacteriological examination of the blood revealed the presence in it of a streptococcus in large numbers, but attempts to produce an inflammation in the eyes of rabbits on the lines of Poynton and Paine's experiments failed. The patient ultimately succumbed to the disease, but a post-mortem examination was not obtainable.

During the course of these attacks there developed in one eye symptoms which were diagnosed as a mild "rheumatic" scleritis and iritis; they very soon yielded to treatment. When the patient subsequently came under the author's observation he suffered from repeated attacks of iritis or irido-cyclitis, varying from a very mild form to a severe inflammation with posterior synechiæ and occlusion of the pupil. Those attacks were further complicated by changes in the fundus similar to retinitis septica; these changes continued up to the death of the patient.

The clinical history of the case and the finding of streptococci in the blood prove conclusively that it was one of general septicæmia characterised by relapses through the repeated invasion of the micro-organisms; and the condition in the eyes is a distinct metastasis. It is interesting to ask whether or not the inflammation in the uveal tract and retina was here due to toxins generated by the streptococci. One might be more inclined to accept such a hypothesis especially on considering the tendency of these micro-organisms to give rise to suppuration. Schüssele, however, opposes this on the ground that it has never been proved experimentally that localised inflammations in the eye are solely due to such toxins circulating in the blood; and he further cites a case similar to this, described by Axenfeld and Goh, where small foci of pneumococci were found in the choroid. Moreover Stock has shown that even very virulent bacteria may be carried along in the circulation and excite in the eye a comparatively mild inflammation, which may subside; he has observed under the microscope emboli of bacteria arising there in this way. Indeed, Stock regards this migration of the bacteria through the blood as a favourable circumstance for the eye, because the organisms are confined by the vessel wall and may be at once surrounded by a mass of protective material in the form of leucocytes, and their products thereby rendered innocuous—in marked contrast to the freedom with which they can multiply when introduced into the vitreous or anterior chamber. Through the changes found in the retina the author thinks that this case has an important bearing on the question of the nature of so-called retinitis septica, and he believes that the white spots which he observed there over a long period really represented numerous bacterial emboli.

Cases of this kind are of great importance in throwing light on the etiology of the non-suppurative inflammations of the uveal tract, and of the iris and ciliary body in particular, which are so often styled "rheumatic." It is highly probable that these cases are also for the most part due to the deposit of bacteria in the eye, and are not really of "toxic" origin, with the exception, perhaps, of those of the true "gouty" and similar types. THOS. SNOWBALL.

BONSIGNORIO. **Eye Diseases due to cold and Ocular Rheumatism.** *Revue Générale d'Ophtalmologie,* July, 1909.

BONSIGNORIO deplores the modern tendency to limit the essential ætiological factors in disease to microbes and toxins to the exclusion of physical agencies. She regards this as an indication of the subordination of clinical observations to laboratory methods which should really be supplementary to the former. Our predecessors ascribed to cold an important place in the causation of exogenous and endogenous infections whether ocular or general. Bonsignorio puts in a plea for a reversion to the less modern view of this ætiological significance of cold.

She insists that in many cases cold by itself is capable of producing the morbid state. As an example she cites the acute conjunctivitis associated with the presence of the staphylococcus albus—normally a harmless saphrophyte and in no way necessary to the development of the disease.

That cold has an important action on the living organism is proved by the fact that animals exposed to increasing degrees of cold show a progressive slowing of the circulation and respiration, which eventually cease altogether.

The local changes (due to cold) vary, according to its duration, intensity and mode of application, from simple ischæmia to necrosis. Intercellular changes are suspended or modified and the composition of the liquid media is altered. The corpuscles are deformed and cellular movements arrested. In lesser degrees of cold the histological changes are less marked.

The first stage of reaction is congestion, calculated to counteract the loss of heat and to maintain the normal local temperature. With greater degrees of cold there occur swelling, pain, hypersecretion and general feverish reaction. The damaged tissue is extruded during the process of repair.

These effects may be set up by a strong current of cold air, as in dental neuralgia or facial paralysis from sitting in a draught, or they be due to a gradual lowering of temperature, as in visiting caves, pits, basements and new houses.

Certain occupations such as laundry-work, in which the workers come much in contact with water, are associated with articular rheumatism, colic, etc. Similarly cold seasons give rise to certain diseases, and respiratory diseases are common in high altitudes though the microbic flora is insignificant.

If several individuals living in a cold damp place are attacked by the same form of conjunctivitis one is not justified in inferring that they have been infected one from the other. Many an old-standing conjunctivitis can be cured by a change of residence, and the closing of a door may be the means of arresting a relapsing iritis.

Certain diseases of the eye vaguely designated " rheumatic " are in the main due to cold and should be distinguished from ocular rheumatism. The former recur and are not dependent on diathesis but rather upon a local dystrophy of some membrane of the eye which renders it more vulnerable to the influence of changes of temperature. Previous attacks and privations have this predisposing effect. Episcleritis, keratitis and iritis recurring in the same eye and at the same period of the year are produced in this way.

In this category the author includes inflammatory glaucoma which usually appears in the autumn, and is associated with congestive symptoms, generally in one eye only, relapsing pain, due to ciliary neuritis, fever, insomnia and exhaustion.

The choroid, iris and optic nerve may be similarly affected and vision be gravely compromised by the exudation. If cold is the only cause of these changes then antiseptic therapeutics has no place in their treatment.

J. Jameson Evans.

Ronvillois. **Chancre of the Bulbar Conjunctiva.** *Revue Générale d'Ophtalmologie*, July, 1909.

Chancres of the lids and eye are comparatively rare. In order of frequency the structures which may be involved are:—the ciliary margin, the eyelid, the palpebral conjunctiva, the bulbar conjunctiva. The latter position must be exceptionally rare, as Sourdille, in 1900, could only find records of 13 cases. Ronvillois' case has points of interest apart from its rarity.

The patient was a man, 24 years of age, who ascribed the trouble in his right eye to a scratch from a finger nail while playing football. The day after the injury the eye was red and watery, but as it was painless it was not brought for treatment for a week. At the end of this time there was marked chemosis of the conjunctiva, with a red crescentic fold between the caruncle and the limbus. At the upper part of this œdematous and indurated roll there was an ulcer about 4 mm. by 2 mm. with two small secondary erosions. There was a similar ulcer at the lower part of the fold. These ulcers had a yellowish appearance and were covered with an opaline diphtheroid membrane. Conjunctival secretion was scanty and the globe itself and its contents were unaffected. $RV = {}^2/_3$. There was no pain in the eye but the patient complained of headache. The left eye was normal in structure and visual acuity. The pre-auricular, submaxillary and upper concatenate glands were enlarged and hard though painless on both sides, the pre-auricular, curiously enough, being even larger on the left side than on the right. Treated expectantly the condition remained stationary for 3 weeks and then began to subside; but thirty-five days after the appearance of the primary lesion a typical roseolar rash developed and the patient was then put on specific treatment. Two months after the date of the alleged infection the chemosis had not entirely disappeared.

The features of particular interest in the case were two points of ulceration instead of one (usual), the coppery redness and woody induration of the chemosed conjunctival and episcleral tissues, and the bilateral adenopathy of specific type. The latter suggests a median anastomosis of lymphatics which has not as yet been demonstrated anatomically. The absence of pain and inflammatory reaction in the eye itself was noteworthy. In the matter of diagnosis, the painless and indurated enlarged glands are almost pathognomonic. A chancre in this situation may be confused with conjunctival diphtheria and secondary and tertiary syphilides. The diphtheritic membrane is much thicker and more extensive than the thin discrete film on the chancre. Corneal ulcerations and acute adenitis are not associated with chancre. Secondary papular syphilides are confined to the conjunctiva and do not involve the episcleral tissues and are not associated with any red lardaceous infiltration such as is seen in chancre. The history and the absence of glandular enlargement will sufficiently distinguish the secondary and tertiary from primary syphilis. It is evident from this case that local prognosis is good but the general prognosis depends upon the severity of the infection and the promptness and intensity of the specific treatment.

J. Jameson Evans.

L. Schreiber and L. Wengler (Heidelberg). **On Experimental Glaucoma, with Especial Reference to its Influence on the Retina and Optic Nerve.** *v. Graefe's Archiv für Ophthalmologie*, 71, 1.

This is an elaborate account of experimental secondary glaucoma produced in rabbits and dogs by Erdmann's method, *i.e.*, by the injection of precipitated iron into the anterior chamber (*v. Graefe's Archiv*, 66). The iron was obtained by passing an electric current of 40–50 M.A. for a period of 4–5 minutes through the aqueous humour withdrawn from the two eyes of the animal operated upon, steel needles being used as electrodes. A fine flocculent dark green precipitate was thus formed at the positive pole. Enough of this flocculent material was then injected into the anterior chamber of one eye to restore it to its normal depth. The result of such an injection into a rabbit's eye is an acute inflammatory reaction with, in addition, severe and lasting secondary glaucoma in about two-thirds of the cases. The high tension was shown by Erdmann to be due to obliteration of the angle of the anterior chamber by local inflammatory reaction around particles of iron occupying Fontana's spaces. The greater part of the present paper is based upon twenty such complete results in rabbits' eyes.

The inflammatory symptoms, which present a picture of severe parenchymatous keratitis, subside in about ten days, but the high tension, which sets in within twenty-four hours, persists in a chronic form. The whole eyeball becames enlarged, with ectasia of the cornea and deep anterior chamber, thus attaining a condition closely resembling infantile glaucoma or buphthalmia in man. The enlargement of the globe reaches its maximum in 8—14 days; it affects the posterior section of the globe at least as much as the anterior. Generally an intercalary staphyloma forms. Occasionally this enlargement is only temporary; the eye may become reduced to the normal size again, even though the tension may remain high. The writers did not find the tension altered by atropin instillations (contrary to Erdmann's experience) or by eserin.

Anatomical observations showed the coats of the enlarged eyeballs to be thinned by stretching. Inflammatory changes were recognisable only in the cornea, in the anterior chamber and in the vitreous. Ruptures of Descemet's membrane were found in nearly all the eyes examined; they were seen in various stages of repair. In the deep anterior chamber there was very little fibrin found after the first or second week. After this period the iron deposit, the granules of which were already enclosed in leucocytes and in a fibrinous network, became encapsuled by membrane formed from the endothelium of Descemet's membrane and of the pectinate ligament. By this membrane the iris periphery was united with the posterior surface of the cornea, and the angle of the chamber was closed.

The iris and ciliary body remained in general free from inflammatory changes, apparently owing to the fact that the particles of iron did not enter into their tissues. The vitreous showed albuminous and fibrinous deposit and apparently proliferation of the normal fibrillar network. Contrary to the observations of Erdmann there was no glaucomatous cupping of the disc. The physiological cup was often widened and deepened, but this was to be regarded merely as part of the general bulbar enlargement.

As regards the retina and optic nerve, a striking fact was the frequent absence of histologically recognizable degenerative changes, in spite of very considerable enlargement of the globe. The retina in rabbits evidently bears considerable stretching, up to an increase of one-fifth of its extent, without obviously suffering. This is so even though the tension of the eye be double the normal, or more (measured by Koster's improvement of Fick's tonometer), for a period of some months, provided the onset of the high tension be gradual. On the other hand well-marked degenerative changes occurred in the ganglion cells and nerve fibres of the retina, as well as in the optic nerve, ascending as far as the optic tract of the opposite side even in three weeks, in cases where a considerable rise of tension set in suddenly. Where the tension rises gradually the resulting distension of the eye appears to be sufficient to protect the nervous elements from definitely injurious pressure. And in parallel cases of a given rise of tension it seems that one eye but slightly enlarged will suffer in this respect, whereas in another eye more definitely increased in size the nervous tissues will escape.

The experiments made upon dogs' eyes were mostly unsuccessful. In only four out of twelve eyes was the required high tension of long duration obtained. One of the four eyes was useless for the desired observations, as the case ended in phthisis bulbi following perforation of a large equatorial staphyloma. And in two of the remaining three eyes observations on the retina were of only limited value, because the retina became detached.

In dogs the enlargement of the globe is apt to be extreme, hence the tendency to retinal detachment. The anterior chamber, instead of being deepened, as in rabbits, was found very shallow or abolished, with the pupil closed by dense inflammatory membrane. Degeneration of optic nerve fibres could be followed as far as the chiasma in one case 37 days after the injection. There was no excavation of the disc seen.

Attempting to apply these findings to primary glaucoma in man, the authors think that the results are somewhat opposed to the Schnabel-Elschnig theory of the origin of glaucomatous cupping. According to this theory (see *The Ophthalmic Review*, July, 1909) the excavation is not due to pressure, directly at least, but is due to localised atrophy of nerve fibres in the neighbourhood of the papilla. In these animals' eyes the absence of cupping, in spite of marked atrophy of nerve fibres, is, so far as it goes, against the above theory.

H. HERBERT.

ROSENHAUCH (Krakau). **Hypopyon Keratitis of unusual Bacteriology.** *Klinische Monatsblätter für Augenheilkunde*, Sept., 1909.

ROSENHAUCH gives brief clinical notes of ten cases of corneal ulceration due to the diplobacillus of Petit, one case due to staphylococcus aureus sarciniformis, and one due to a gram-negative bacillus of uncertain classification, with descriptions of the organisms found and their cultural peculiarities. The literature on the subject is also freely referred to.

The interest in the two isolated cases depends on the possibility or otherwise of identifying the organisms found with any known ones, and the comparison of their clinical phenomena with those of other recorded cases. The amount of material is very small and the two cases are welcome in the literature.

With regard to the 10 cases due to Petit's bacillus, while the clinical notes given are too meagre to allow the reader to decide the question as to whether or no these cases can be differentiated from the pneumococcal without a bacteriological examination, it appears that such was possible with a fair degree of success, the differentiating characteristics being found in the infiltration of the floor, the advancing and healing edges, and the depth of the ulcer.

The treatment adopted was not the customary one of irrigation with sulphate of zinc lotion, and the results were apparently less favourable than those obtained by zinc.

One of the cases presented an interesting peculiarity in that with a lacrymal sac infection from pneumococci, the ulcer contained only the diplobacilli.

ANGUS MACNAB.

CURT ADAM. **Therapeutic Pocket-Book for Ophthalmic Practice.** Berlin, 1909.

THE author of this book is the assistant surgeon at the University Clinic in Berlin and he has managed to bring together an immense amount of information which cannot but be of great utility for purposes of reference. It is impossible in a matter of 240 pages to give more than a synopsis of modern ophthalmic practice, and perhaps he would have been well advised to have left out altogether the section on lenses and to have confined his work entirely to the remedies which are still used by ophthalmic surgeons and to a discussion of the diseases for which they are employed. He begins by mentioning the various remedies for eye use, particularly the mydriatics, myotics, local anæsthetics, etc. Ample directions are given as to how they are to be used and the best preparations to obtain good results. Then follows a section dealing with the constitutional treatment of persons afflicted with eye diseases, in which special prominence is given to serum therapeutics. The article on tuberculosis seems to us to be of special interest. The third section of the book deals with the treatment of the various diseases of the conjunctiva, of the cornea, of the iris, etc. The last portion is devoted to a discussion of first aid in eye injuries.

Altogether the book is one which we can recommend to a young practitioner who, during his course, has somewhat neglected his ophthalmic studies and who has a competent knowledge of the German language. We have not come across anything specially new in the book, but still we think it a carefully written volume, and well up to the most recent work.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, October 21st, 1909.

The President, Dr. G. A. Berry, *in the chair.*

A new Retractor for use in Excision of the Lachrymal Sac.—Mr. N. Bishop Harman.

This instrument combines the actions of Müller's and Axenfeld's retractors, but without the inconveniences of the upper limb of the latter. To the spring end of a Müller's retractor a long claw is attached, which can be drawn back by means of a milled nut fixed behind between the arms.

To put it into use, the long claw must be pushed home to just behind the side prongs of the lateral blades; then the instrument must be inserted between the lips of the wound *closed.* Release the check screw and the blades spring apart; then by means of the milled nut the long claw must be drawn down until it impinges on the lower angle of the wound. The front claws of the blade are pivotted and so shaped that they oppose the backward drag of the long claw, and in this manner the incision is stretched tight.

Two sisters with Symmetrical Discoid Cataract.—Mr. N. Bishop Harman.

Two sisters in a family of 4 were found to have this variety of cataract; the discs were perfectly regular in outline and semitransparent. Of the two other children in the same family, one, a boy, died at 4 years of age, and a girl, aged 2, had perfectly healthy lenses. One of the patients was 9 years old and the vision in both eyes, with correction, was $^6/_6$; the other child, 7 years, had vision of $^6/_9$ with correction.

An Albino Negro.—Mr. N. Bishop Harman.

The man, who appeared to be about 20 years of age, was born of parents who were quite black, as also were his brothers and sisters. In his form and features he was a typical negro, but his hair was a pale straw colour.

The man kept the palpebral fissures half closed and manifested intolerance of light; there was also a lateral nystagmus. The irides had a yellowish tint, but the fundus was not visible through the iris tissue. The eyes shewed high myopia and some astigmatism. The colour of the fundus was a pale buff, with little distinction between the colour of the disc and that of the choroid.

Two cases illustrating Irido-sclerectomies by the Open Method in Glaucoma.—Mr. G. Brooksbank James.

Mr. Brooksbank James's method is to turn down a conjunctival flap, then incise the sclerotic from without inwards with a Beer's knife, and when the iris presents perform an iridectomy in the usual way. Small pieces are then punched out of the sclerotic from the upper lip, and the conjunctival flap replaced. He gave notes of 2 cases treated in this way, in which the vision 3 to 5 months after operation remained as it was before, with practically the same correction, the tension was normal, and the scar obviously filtering.

A case of Marginal Keratectasia—Bilateral.—Mr. J. Herbert Fisher.

A.G., female, aged 41, unmarried, came recently with the history that the right eye had been inflamed 15 or 16 years ago, when she was under Mr. Doyne's care at Oxford. The eyes had never again been inflamed or painful, but she thought her sight was getting worse. The vision in the right eye was $^6/_{60}$, and that of the left $^6/_6$, with correction.

In each eye the corneal curvature is distorted by great stretching of an upper marginal segment of crescentic shape, the stretched segment being limited towards the corneal tissue by a well-marked, greyish-white line, not unlike an arcus senilis, but Mr. Fisher was of the opinion that this line really represents the inferior limit of the natural scleral arc, and therefore that the stretched crescents represent the marginal vascularized part of the normal cornea. The stretched segment forms almost an angle with the normal corneal tissue, and at the highest point, its widest part, is roughly twice as wide in the right as in the left eye, the actual measurements being 4 mm. and 2½ mm. respectively. In other respects the eyes are healthy. Similar cases are described by Fuchs (*Arch. f. Ophth.*, lii, 1901, pp. 327 and 328) and another case illustrated by Terrien (*Arch. d'Ophth.*, vol. xx, 1900, p. 12) is almost identical with the present one.

Retraction of the Globe on Blinking.—Mr. H. Grimsdale.

E.C., aged 12, came for treatment on Oct. 18th, 1909, complaining of occasional double vision, and that the movements of the eyes were somewhat strange. The vision in each eye was $^6/_9$, with +1 sph. Movements in all directions were free except upwards, and in this direction the eyes rotated 15° and then stopped. On blinking there appeared to be retraction of the eyes, and if the lids were held open actual retraction was very evident, as if all the muscles were thrown into spasm; some of the facial muscles were also spasmodic. There was marked optic neuritis of cerebral type, the swelling being about 5 D. Urine normal.

PAPERS.

A note on the making of Pedigree Charts.—Mr. Priestley Smith.

Mr. Priestley Smith exhibited a pedigree chart in which printed symbols were employed in place of hand-drawing. Simplicity of form and precision of significance were aimed at. A chart made in this way was well adapted for photographic reproduction in reduced size for publication. He employed ready-made characters printed on slips of paper of sufficient size to be legible at 30 feet or more. The symbols were those usually adopted, with the following modifications: the appendix marking the sex is an arrow in each case, pointing vertically upwards for the male, vertically downwards for the female. If a case had been personally examined a horizontal line is drawn through the base of the arrow, while the omission of this line means that reliable information has been obtained, though an examination has not been possible. A horse-shoe shaped sign, instead of a circle, indicates that there is no evidence, and this symbol is easily converted into a complete circle when the necessary information has been elicited.

A pedigree of Congenital Discoid Cataract.—Mr. Priestley Smith.

Mr. Priestley Smith exhibited a chart containing an extensive pedigree of congenital discoid cataract, consisting of 6 generations of a family named Forman, settled in and about the village of Stapleton, near Hinckley, in Leicestershire. The family belongs almost exclusively to the labouring class, some are farm labourers, and some coal miners. On the whole they are a healthy family; many have dark hair like the Coppock family, but there are to be found some with light hair both among the affected and unaffected.

The cataract was in all cases found to be discoid and post-nuclear, the size varying and thus producing different degrees of visual impairment.

John Forman, the progenitor, was a carrier, who was known to be troubled with a peculiar weakness of his sight all his life, so that he had to shade his eyes to see well; of his two brothers the elder had good sight and left many descendants among whom no defect of the kind had been known; the younger brother died without issue. John Forman had 14 children and several of these had large families. The number of his descendants was 113, and of this number information was obtainable as to 102, and out of these 26 were affected with discoid cataract; of the 26 affected 24 have been examined and of 76 unaffected 49 have been examined. Excluding unaffected childships, and also from affected childships persons about whom no information is forthcoming, we have 51 cases remaining, of whom 26 are affected; this equals 50·9 per cent.: 15 male and 11 female. With one exception every affected person who has had offspring has transmitted the disorder, the exception being in the case of a man who has at present only one child.

The form of cataract which affects this family has therefore the character of a Dominant according to the Mendelian theory.

PRESIDENTIAL ADDRESS.

Dr. G. A. Berry, in his presidential address, took as his theme the subject of treatment as it has been in the past and as it appears in the present day. At one time the art of medicine and surgery was ahead of science; now the science of medicine has not only overtaken but outstripped the art.

In ophthalmology treatment is more varied than it is for most other parts of the body. It embraces surgical treatment, optical treatment, local application of drugs and other methods. Dr. Berry entered into the history of cataract extraction, of which the first record that we possess dates as far back as B.C. 25. He traced the history of the operation up to 1866, since which time there had been no radical change in its technique. The first operation for artificial pupil was performed in 1728; iridotomy also was an operation of fairly early date. Dr. Berry, after referring to the many modifications of iridectomy shewed that nearly all operations had their prototypes in the practice of the most ancient surgeons.

Spectacles first came into use in the 13th century, although 300 years before this the laws of dioptrics were known, and towards the end of the 15th century their use became general.

Dr. Berry next described the various methods of non-operative treatment, discussing the older methods of bleeding, setons, etc., and pointed out that Chamomile and Hyoscine were known from very early times. Massage and drug treatment was also in vogue for the treatment of trachoma, and about the middle of the 18th century Goulard's lotion was extensively employed in ophthalmic work. A little later 1 in 4,000 perchloride of mercury was used, and in the same century mydriatics were discovered. v. Graefe introduced silver nitrate as a form of treatment, and about the same time myotics came into use. He referred to the varieties of new treatment in our own day, such as Quinine, Electricity, Ionization, Roentgen Rays, and Subconjunctival Injections.

MALCOLM L. HEPBURN.

INTRAOCULAR INJECTION AND IRRIGATION IN THE TREATMENT OF UNRIPE CATARACT.

By Wm. Marcus Killen, B.A., M.D., M.Ch.,
Surgeon, Benn Ulster Eye, Ear and Throat Hospital, Belfast; Clinical Lecturer, Queen's University, Belfast.

Having been assistant during the last 14 years of his life to the late Dr. M'Keown, and having demonstrated his method of irrigation during cataract extraction to a number of members of the Ophthalmic Section of the British Medical Association at the recent Belfast meeting, I have been invited to contribute a short paper on the subject.

My late friend had a good practical classification, a glance at which is necessary before proceeding. Cataracts are to be considered structurally, functionally, and surgically. Leaving aside congenital and other forms occurring in young people, and in which irrigation is not indicated, lenticular cataracts—after the age of nuclear development—are cortical, nuclear, and nucleo-cortical.

In regard to the stage of development they are complete and incomplete. A complete lenticular cataract is one in which " the opacity has affected the whole of the lens, or at least its superficial layers, and in which the cortical opacity has become equal and uniform." In incomplete cataract the opacity has not become equal and uniform. All cataracts, therefore, which are striated, flaky, cloudy, segmented, mother-of-pearl, dotted, lamellar or partially opaque are incomplete. Functionally considered, cataracts are complete when the patient cannot distinguish fingers with his back turned to the light. A lenticular cataract structurally complete is also functionally complete, while a lenticular cortical cataract may be complete functionally, but at the same time incomplete structurally. Surgically considered, cataracts are complete which can be removed easily on rupture of the capsule. Pure nuclear cataract with a fairly transparent cortex is structurally and functionally incomplete, but frequently at the same time surgically complete, *i.e.*, easy to remove, although one cannot be certain of this before operation.

Nucleo-cortical cataracts are to be considered as cortical in questions of time of operation and probable ease or otherwise of extraction, the condition of the cortex being all important, not forgetting, of course, the relation between the size of the nucleus and the size of the section.

Seeing the red of the fundus by the ophthalmoscope, and even some of its details, does not necessarily indicate, in nuclear cataract, a difficult operation, as the cortex is frequently sclerosed and then comes out whole without irrigation. Not seeing the red of the fundus in cortical cataract does not necessarily indicate an easy operation if the opacity is not uniform. In fact we may have difficulty with the cortex even in patients over 80 years of age where there is not uniform cortical opacity. I have myself squeezed out a hard nucleus and left nearly the whole of a pearly cortex in a patient of 84. The broad rule that unripe cataracts in patients over 60 can usually be easily removed owing to sclerosis of the lens is a good one, but there are many exceptions, and in these exceptions irrigation gives much assistance.

The principle of irrigation is the possibility of converting at the time of operation a surgically unripe into a practically ripe cataract. The essentials of the operation are that the solution (4 grains of common salt in each ounce of distilled water) should be absolutely sterile, and of about blood-heat, that a high pressure be not used, that the integrity of the vitreous be preserved, and that the cases be suitable ones for this method. The cases likely to benefit are those chiefly of incomplete

PLATE I.

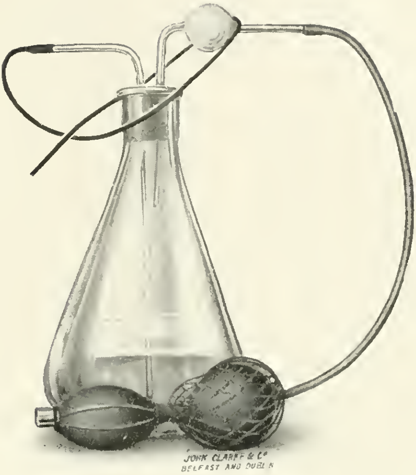


Fig. 1.

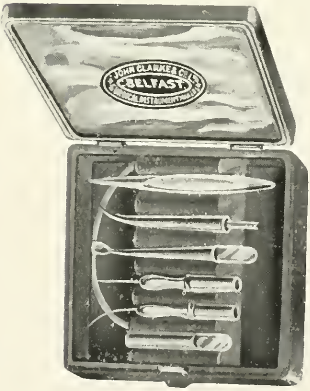
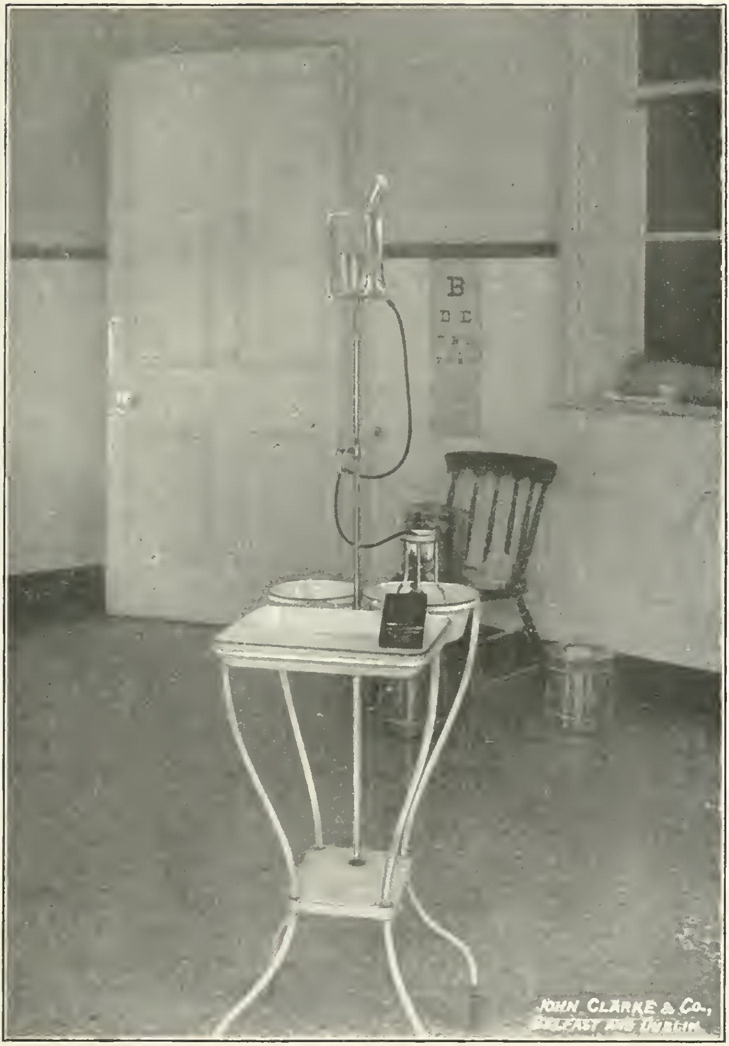


Fig. 2.

cortical cataract at any age after the formation of a nucleus, especially where a shallow anterior chamber shows cortical swelling. The cases where it is frequently unnecessary are pure nuclear cataracts, such as the amber and dark-brown varieties, where we suspect sclerosis of the cortex, even if this is still clear to some extent, from observing a deep anterior chamber. Occasionally in incomplete nuclear cataract one meets a troublesome cortex which will benefit by irrigation.

A very brief account of our apparatus is necessary. The photographs will convey a better idea than a written description: Dr. M'Keown, in his earliest work, used a syringe, but soon gave this up for the flat-bottomed Florence flask which we still use. (Pl. I., Fig. 1.) This is closed by a well-fitting cork through which pass the two glass tubes seen in the illustration. The short tube has a bulb in which a little sterile cotton is placed as a filter to the air, and only penetrates a little way into the flask well above the level of the solution. It does not require to be moved at any stage. The other tube is longer, must be pulled up above the level of the fluid during the boiling and before use pushed down again nearly to the bottom of the fluid. The stopper may be cork or rubber; the former is the more manageable. The holes in the rubber cork can be enlarged most easily by rubbing them with chloroform if the fit is too tight. About a pint of saline should be in the flask, and should not much more than half fill it. The short tube has the indiarubber bellows attached, a squeeze or two of which will start the syphon action when required. The rubber tubing attached to the other glass tube is to carry the solution to the needle or nozzle. The needles and nozzles are also illusrated in their case (Fig. 2), and need not be described further than to say that each contains a little arrangement where the rubber tube slips over it, by which the surgeon has full control of the flow through it as he holds it between his finger and thumb during irrigation. These are sterilised separately with the other eye instruments. The " solution " is boiled in the flask over a Bunsen flame or gas ring (having first removed the indiarubber bellows), and boiling should continue till the steam has been escaping for some minutes from both of the tubes. When about to cease boiling a small clamp is put on the long rubber tube and kept there during cooling. Were this not done non-sterile air would be sucked into the tube and flask. The sterilising should be done some time before operation, to allow time for cooling down to the required temperature. The apparatus may be kept in an incubator if desired. My late colleague, Dr. Allen, some years ago introduced the other irrigating apparatus also shown. (Pl. II.) The all-glass receptacle containing the fluid can be boiled over the flame with a little wire gauze between, and is then cooled and placed on the vertical stand, which can be lengthened or shortened according to the height desired during operation. The stem is attached to a convenient operating stand. The tube, when not in use, is clamped and the nozzle placed in the little cup containing water kept boiling by the little spirit lamp. I like Dr. M'Keown's apparatus best for the first or needle part of the operation, since by a cautious squeeze or two of the bellows one obtains a stronger stream through the fine needle. One must, however, use the bellows with very great care or we may burst the flask or put a dangerous pressure on the lens. The flask has the additional advantage that a trained assistant can more nicely regulate the pressure of fluid by raising or lowering the bottle than can be done with Dr. Allen's more fixed arrangement. The latter apparatus comes in very well for nozzle irrigation after removal of the lens. The bottle should not be very much higher than the patient's head as considerable pressure is, I think, much more dangerous when the protection of the

PLATE II.



lens is gone and one may be in doubt as to the integrity of the posterior capsule and suspensory ligament. An irrigating apparatus used for cataract work obviously must never be used for any other purpose, certainly never in septic cases. It is absolutely essential that only a nurse or assistant trained for the purpose shall have charge of this during sterilisation and operation.

The procedure is divided into two stages, either or both of which may be used as the case indicates. A very perfect light must be concentrated on the cornea. After the usual sclero-corneal section and iridectomy, and before capsulotomy, the irrigating needle is introduced through the wound and made to penetrate superficially the capsule. If the cortex be soft the needle enters readily and the solution diffuses itself under and near the capsule. Transparent cortex is rendered opaque and striated flaky or mother-of-pearl substance is rapidly broken up and separated from the capsule. In soft cases the needle may be made to move about quickly, and thus assist the action of the fluid. The needle should penetrate the capsule about half-way between the corneal section and the centre of the pupil so as to avoid penetration of the edge of the lens or of the zonule. It must be kept well in front of the nucleus. The use of the irrigating needle gives us a valuable indication of the consistence of the lens. If it do not penetrate the capsule readily, but be seen instead to push the whole lens before it, we are here dealing with a sclerosed cataract, and must at once withdraw the instrument lest we dislocate the lens. We know that we shall not require any irrigation to complete the operation in such a case. In some patients the cortex becomes so semi-fluid during injection that a condition very similar to Morgagnian cataract is produced. Section of the capsule is now performed in the usual way and the lens delivered, after which we remove the needle from the indiarubber tube and substitute the nozzle. We have now to deal with any residual cortex by massage and further irrigation. Before commencing this the speculum must be removed, and instead the lids be kept gently separated by the fingers, the surgeon raising the upper lid while an assistant draws down the lower one. The eye must not be fixed with forceps after removal of the lens and during further irrigation or we shall probably have escape of vitreous. The heat of the fluid is tested by allowing it to flow on the back of the hand and then the nozzle, clamped between the finger and thumb, is introduced between the lips of the corneal section. This latter precaution is found necessary owing to the involuntary muscular contraction which frequently follows if one permit fluid to drop on the patient's eyelids. The fluid is allowed to enter the anterior chamber at a rather low pressure which can, if desired, be cautiously increased by the assistant slowly raising the flask. Light is concentrated on the cornea by a lens and the action of the solution carefully observed. In many cases it is seen to render opaque masses of cortex, to bring them from concealment behind the iris and to wash them out of the eye. The diffusion of the saline is much assisted by combining it with gentle massage. Where cortical substance is found to be sticky and difficult to remove we must not hurry, but give the eye a short rest by removing the nozzle, thus allowing the fluid more time to act. We may then safely continue the irrigation for a very considerable time. Failure to obtain good results in using the method may with some be due to a not unnatural timidity at this stage. When we think we have irrigated sufficiently and can find no more opaque cortex we replace the iris and if possible leave the lips of the wound in nice apposition and the anterior chamber full of saline.

The method is specially useful in the unripe cortical cases, especially such as show swelling of the cortex and the usual pearly, striated, flaky, lamellar or dotted appearance. Nuclear cataracts with cortical opacities may benefit by irrigation in the same way as the cortical varieties. Pure nuclear cataract, even when it shows a fairly clear uniform cortex, is as a rule easily removed without irrigation, although one has occasionally fairly soft cortical matter to deal with, and it is therefore wise to have the apparatus ready at hand. A deep anterior chamber in nuclear cataract points to the probability of a hard lens and contra-indicates the trial of this procedure, the attempt to use which here might cause vitreous to escape. In doubtful cases one who does not use irrigation might safely enough before operation insert a stop needle through the cornea and thus cautiously test the consistence of the lens. I think Elliott, of Madras, suggested this, but I have not his paper at hand.

Now, a word as to results. I think in the hands of an experienced operator who has got over the trial stage of this method the immediate results are probably as good as those obtained by other surgeons of equal operative experience, while patients have earlier relief, with fewer secondary operations. Dr. M'Keown's analysis of 154 cases showing only four total failures, 145 successes with vision varying from $^{20}/_{200}$ to $^{20}/_{20}$, and these all cases of incomplete or unripe cataract, proves what can be done by experience and care in detail. With great care in the sterilisation of the apparatus and the solution we ought not to have a larger percentage of cases of infection of the wound than by the older methods.

Suppuration is very rare, and of the few cases where we have observed it, in at least two the cause was known not to have been irrigation, while in no instance could it be traced with certainty to that procedure. A certain number of eyes show mild iritis which usually yields to simple treatment. Loss of vitreous in smaller or greater quantity is an accident which should grow less frequent as our operative experience increases. Those who have irrigated great numbers of cases in India do not seem to consider this as one of the serious risks. I have had in my practice three cases of permanent striate corneal opacity. I attributed this to the mercury solution having found its way into the anterior chamber, and have therefore abandoned the use of this antiseptic after the corneal section has been made.

Before concluding, I must acknowledge that there seem to me to be, notwithstanding previous remarks, certain grave risks attached to intraocular irrigation which must be weighed against the advantages which can undoubtedly be derived from its practice. To my mind the most serious by far of these is the possibility of injuring the vitreous body even though it do not show at the time of operation. After the delivery of the lens it does not always seems possible to be sure that the delicate structures which still remain to close off the anterior from the posterior chambers of the eye are quite intact, and the degree of fluid pressure necessary to empty the lens capsule of sticky cortical matter only seems justifiable if we have good reason to be satisfied that these structures will successfully resist the penetration of saline into the vitreous chamber, or along the tissues of the uveal tract. One unfortunately meets now and then with a patient who has left hospital with an admirable visual result, and who returns some months or years later showing greatly diminished vision. Examination reveals large floating vitreous opacities most frequently; less often, choroidal degeneration, a cloudy condition of the fundus, a pale disc, or even evidence of glaucoma, although I have seldom seen this latter disease follow operation. Two or three cases of detachment of the retina have come under my notice, but I attributed these to early escape of vitreous where irrigation was consequently not, or scarcely at all, used. Some of these failures have been seen in eyes in which there was reason to suspect previous deep-seated disease. We all know the wretched state of health and the liability to various tissue degenerations so many elderly patients with cataract exhibit, hence we find it a difficult matter to say how far occasional deteriorations of vision, occurring long after operation, can be attributed to operative procedure, and how far to previous tendency to diseased action. I am satisfied that the question of the value of irrigation as a means of removing unripe cataract cannot be settled permanently till its remote, as well as its immediate, results have been carefully compared with those obtained by more conservative procedures. The question of the value of Smith's operation must be similarly tested. I will conclude by strongly advising all who may think of giving the method a trial, to delay doing so unless they have already a large experience of extraction, or until they have gained such an experience in fields where this method is not used. Having learned how to avoid as far as possible the risks of the more usual operation they will be in a good position to add this new device to their equipment, and, I think, will find it very useful in the treatment of carefully selected cases. To those who have not had an opportunity of studying Dr. M'Keown's work I would offer this short paper as an introduction. They will find there the fullest and most complete treatment of the whole subject.

NOTE.—The apparatus described is furnished to us by Messrs. John Clarke and Co., surgical instrument makers, Donegall Square, W., Belfast.

REFERENCES.

M'KEOWN. "Unripe Cataract." H. K. Lewis.

HERBERT. "Cataract Extraction." Baillière Tindall & Cox.

REVIEWS.

E. Landolt. **International Uniformity in the Terms Expressive of Visual Acuteness.** *Archives d'Ophtalmologie,* 1909, 6.

Of the questions discussed at the XIth International Ophthalmological Congress none was more important than that of the mode of expression to be agreed upon, indicative in all languages, of the acuteness of vision. A Committee was appointed to report to the Congress of 1909 (Naples), consisting of Hess (Chairman), Charpentier, Dimmer, Eperon, Jessop, Nuël and Reymond, and their report was then adopted.

The subject of the report resolves itself into two matters, viz.: the principles underlying the expression of the visual acuteness and the type of test-material recommended by the Committee.

On the first point they laid down six general principles: the test to be based upon the *minimum separabile,* or the capacity to perceive an interruption to continuity; the test to be made by means of a black ring upon a white ground, the ring to be broken at one part for a space equal to the width of the limb of the ring, which is one-fifth of its diameter; the visual acuteness to be expressed in relation to the smallest angle under which this can be deciphered, or in other words to the maximum distance at which this can be done; a visual angle of one minute to be the standard of comparison; the mode of expression to be either in decimals or as a fraction $(\text{v.} = \frac{\text{d}}{\text{D}})$; and, lastly, the eye to be tested only at a distance from the test object.

Landolt expresses full concurrence with their decision, and satisfaction that the Committee should have affirmed the principle which regards the degree of visual acuteness as proportional to the distance at which the type is recognised, and not to the square of that distance, as has been advocated by some.

In the choice or construction of the vision test it is highly desirable that the object should be one not capable of being merely guessed at, recollected, or arrived at by exclusion as might be the case with letters, which have the further disadvantage that they are familiar to the literate but unfamiliar (and therefore more difficult to discern) to the relatively illiterate. The test object should, in addition, be of such a character as to require only direct and simple answers, a desideratum which has told greatly hitherto in favour of letters as tests. It is further essential that the examiner should be able to control and keep a check on the replies of the person examined.

These demands are all met by the use of the interrupted ring test, for it adapts itself to the principle of the *minimum visibile*: it is the same for all persons and in all positions; race, instruction and education have little or no influence on its efficiency. Question and answer are of the simplest, for a slight movement of the hand will show the position of the aperture, and the whole is so readily regulated by the examiner, who can, if he wishes, rotate the "type" into different positions without any change in its aspect or in its meaning or its visibility. On these grounds, both theoretical and practical, the interrupted ring test object has commended itself highly to the Committee.

Secondly, the scale recommended has great advantage in its simplicity. One can either, using one size of type, discover the maximum distance at which this is visible to the patient, or, employing objects of different size, place the patient at a certain fixed distance. The latter is naturally the method practically always adopted, and to represent the acuteness of vision enjoyed one employs the scale of 0·1 up to 1·0 or 2·0. It is constructed on the basis of $\text{v.} = \frac{d}{50}$, d being the distance at which the patient reads the "letter."

Landolt criticises very unfavourably however, and, as it seems to the reviewer, with justice, the action on the part of the Commission of placing, side by side with the proper test object, Arabic figures constituting a second test. Now whatever argument can be brought forward against letters applies with even greater force against figures (numerals): they are less familiar than letters to the majority of persons, and even if they are in general terms international the precise form of the numeral is certainly not universally identical, the figures by no means carry out the principle of the *minimum separabile*, and they are not equally clearly visible even under the same visual angle. They may be convenient as mere test objects, but are without value from a scientific point of view.

W. G. S.

F. LAGRANGE (Bordeaux). **Spontaneous Disappearance of Hypermetropic Astigmatism.** *Archives d'Ophtalmologie*, July, 1909.

IN 1905 Lagrange wrote an interesting paper on this subject which he follows up now by the description of the cases of eighteen young persons, recently seen by him, whose astigmatism had been carefully compared at considerable intervals of of time. These he classifies into three groups, thus: The members of Group I wore regularly the correction of their astigmatism; those of Group II did so only intermittently; those of Group III never wore correcting lenses at all. Examined at a subsequent occasion the members of Group I retained their astigmatism unchanged; those of Group II had changed only slightly; those of Group III had markedly improved, *quoad* the total amount of astigmatism.

It is of course with corneal astigmatism that Lagrange is concerned here, and in each case it was with the Javal Ophthalmometer that the test was made. We shall briefly summarise the cases in the different groups, and shall forbear to introduce the exact details. In the first group were six patients:—

(1) A girl examined at 11 and at 24 years of age: her 1 D of astigmatism (with H. 5·5 and 3·5 D in the two eyes) remained the same.

(2) A man examined at 12 and at 25; his 3·5 D of astigmatism remained the same.

(3) A man examined at 13 and at 25; his astigmatism of 1·5 and 2·0 D (with H of 10 and 8 D) remained the same.

(4) A girl examined at 8 years of age had R.E. 6 DH and 1·75 D As. L.E. 8 DH and 1·5 D As. She underwent double tenotomy for strabismus and wore correcting glasses. Examined at 18 years of age there was not more variation in the astigmatism than $\frac{1}{4}$ D.

(5) A boy of 9 had 3 D of astigmatism, with hypermetropia. He underwent, on account of strabismus, double tenotomy of the internal recti *plus* capsular advancement of the right external rectus, and wore glasses; eleven years later, his astigmatism was exactly as before.

(6) A girl, age not given, was operated upon for strabismus convergens in 1903, and refraction was examined then and again in 1908; the astigmatism (3 D in one eye and 0·5 D in

the other) had remained unchanged, though the hypermetropia had diminished.

Lagrange's second group included those who had worn glasses intermittently: three records are given:—

(7) A girl, now 24, had in 1897 been ordered by Lagrange cylindrical lenses (1·75 D axis vertical and 3·0 D axis vertical in the two eyes) to be worn constantly: the amounts of astigmatism at that time had been determined as 1·75 D and 3·5 D respectively. The glasses had only been worn intermittently and the astigmatism now stood at 2 D and 3 D. In one eye, therefore, and that the superior one (though with the higher error as regards astigmatism), the astigmatism had become slightly reduced.

(8) A boy of 19, who in 1902 had 3·0 D and 4·5 D of astigmatism in the two eyes; the glasses prescribed, having a sphere with 2·0 D and 3·5 D cylindrical respectively, had not been regularly worn, and the present estimation showed a diminution in the amount by 1 D in the left eye.

(9) A boy of 13 years: ten years ago his astigmatism was 3 D and 3·5 D along with high hypermetropia, and his internal rectus of the left eye was divided for strabismus. The ophthalmometer now shows 2·5 D and 3 D,—a slight diminution. He had never worn his glasses more than intermittently.

Lagrange's third group is composed of patients who have not hitherto worn glasses.

(10) A girl of 16 who in June, 1898, had (besides hypermetropia) 3·0 D of astigmatism in her right eye and a convergent squint, and in her left eye 2·5 D of astigmatism, with hypermetropia. The glasses then ordered were never worn and the girl went on with school work and then with dressmaking. Now she has 3·5 D of astigmatism in her right eye, of which no use is made, while the left eye shows a reduction of 1·0 D in the astigmatism.

(11) A boy of 19 who in 1898 had 2 D of astigmatism, and who wore glasses for one year only: in 1908 he had in the two eyes 0·75 D and 1·25 D of astigmatism respectively. The right eye, in which the acuteness of sight was better, had undergone the greater improvement.

(12) A boy who was aged 10 when examined in 1898, was found to have in his right eye 10 D of hypermetropia and 2 D of astigmatism: in the left eye 9 D and 1 D. In November of 1908

he was again examined and was found to have in the right eye 8 D of hypermetropia and 1 D of astigmatism; and in the left eye 7 D and 1 D, but with much worse vision in this eye than in the other: here again the worse eye, visually speaking, which is little used (though it has less hypermetropia than the other), has retained its astigmatism.

(13) A boy who in 1898 was found to have 1 D of astigmatism, but who neglected to wear his prescribed lenses, returned in 1908 complaining of discomfort in the eyes. In 1908 his astigmatism was less by one half in the left eye: it had remained the same in the other.

(14) A boy of 12 who in 1898 had 3 D of astigmatism in each eye, but the prescribed glasses were frequently not employed, even in the first year, and after that not at all. The amount of astigmatism was 3 D as registered by the ophthalmometer; in the right eye it has remained at that figure; but the left one, which is the eye most used, has lost one dioptre of it: this is the eye which possesses the better vision.

(15) A boy of 14 had 3 D of hypermetropic astigmatism in December 1900; he wore the prescribed glasses for four months, after which they were discarded. In 1908 examination showed 2 D in the right eye, with full vision, and 3·5 D in the left with poor vision.

(16) A boy (age ?) had a double tenotomy performed for strabismus of the left eye in 1901: at that time he had 2 D of astigmatism. In 1909, not having worn glasses at all, he had 1 D of astigmatism in the right eye and 1·75 D in the left. In this case also the unused eye had practically the same amount of astigmatism at the two examinations, while the eye constantly employed had dropped a considerable degree.

(17) A girl of 17 had 3 D of astigmatism in the right eye and 2·5 D in the left in 1903. Six years later, she not having worn any lenses in the interval, there was only 1 D of astigmatism in the right eye and 0·5 D in the left.

(18) A girl of 14 in 1902 had 4 D of hypermetropia and 3 D of astigmatism in the right eye, 2 D of hypermetropia and 4 D of astigmatism in the left, which had very superior acuteness of sight as compared with the other. She wore no glasses, and in 1909 had the same amount of astigmatism in her right eye that she had in 1902, but in the left the degree had gone

down to 2·75 D; again the eye most employed and with the better vision was found to have improved.

The facts thus revealed in regard to the incidence of astigmatism are in accordance with the known frequency of astigmatism with the rule ("direct" as Lagrange calls it) before adult life is reached, and the infrequency of astigmatism against the rule ("perverse" or "indirect") during the same period. According to Faendrich up to 20 years of age perverse astigmatism is extremely rare, from 20 years to 40 about 20 per cent. of the cases of astigmatism are perverse, from that time the frequency of perverse astigmatism continues to increase so that after 58 years that form is the more common and after 75 years three-fourths of all the cases belong to that category. As this is practically always corneal it must be evident that the curvature of the cornea tends gradually to alter as age goes on in such fashion that the refracting value of the horizontal meridian tends always to increase. The regular or direct astigmatism present in childhood must then tend to diminish. On the strength of his observation of these eighteen cases related above Lagrange concludes that possibly we make a mistake if we correct at all fully the astigmatism and the hypermetropia of a young patient, because by so doing we may hinder the subsequent corrective development of the cornea.

Lagrange then makes an observation with which the reviewer is heartily in accord and which should, he thinks, be taken to heart very specially in these days of almost reckless ordering of spectacles and particularly in these days of examination of school children, viz., that no young person should be made to wear glasses who does not clearly show symptoms definitely attributable to the hypermetropia and the astigmatism. The reviewer would add to this that in the absence of symptoms on the part of the child he should not be ordered glasses simply for the purpose of screwing up the vision to a purely arbitrary school standard. Lagrange's view is that unless there are certain definite indications of necessity for different procedure astigmatism of less than 2D should not be corrected in the case of a young hypermetrope—a spherical lens alone being employed; one thus does not interfere with nature's efforts after gradual cure. He believes that in the young astigmatic the ciliary muscle, acting strongly, alters the curve of the horizontal meridian of the cornea, which thus gradually and insensibly acquires a reduced radius. W. G. S.

L. Laqueur (Strassburg). **"An Account of My Own Case: Glaucoma."** *Klinische Monatsblätter für Augenheilkunde*, June, 1909.

This is the third instance of the publication of personal experience of chronic glaucoma by an ophthalmic surgeon. There is nothing exceptional in the facts. But eye surgeons must feel an interest in the personal narrative by one of themselves, a trained and accurate observer.

Laqueur, like Javal, was a Jew, exemplifying the racial predisposition. His case fortunately ended well, like that of W. Wagner of Odessa, and in contrast to Javal's well-known tragic record. The present account, though only published now after the patient's recent death, was written in 1902, twenty-two and a half years after a cure had been obtained by iridectomy in both eyes. There were thus many years during which Laqueur was able to appreciate the debt which he owed to von Graefe, who had rendered cure by operation possible.

Laqueur states that his eyes were always somewhat oversensitive to light. This sensitiveness was increased during numerous recurrences of slight conjunctivitis, which troubled him from the age of 22 years onwards. Thus he frequently had recourse to the use of neutral tinted glasses. Both eyes were emmetropic until at the age of 33 years he acquired a slight astigmatism of the right eye, +0·75 D with the rule, apparently from the pressure of pince-nez with strong spring, worn during a three weeks' holiday.

At 35 years of age the prodromal stages of glaucoma began with the appearance of a mist before the right eye one hot day in July, 1874, as he was returning late to mid-day dinner, very tired. During the meal the mist appeared also before the left eye, and when he turned on a light he saw the ominous coloured rings which were often to embitter his life in the following years. The hardness of both eyes confirmed the diagnosis. The symptoms passed off in a few hours and did not return for two or three months. Subsequent seizures were almost all confined to the right eye. Of these there occurred many hundreds, the intervals between them gradually lessening until sometimes three attacks occurred in the one day, each lasting an hour or more. Occasionally they occurred even during the night or on awakening in the early morning.

A detailed description of the symptoms was published in *v.*

Graefe's Archiv., Bd. xxxi. The diameter of the halo-figure measured only 8°–9°. In the severer attacks of rather long duration the colours of the rings were paler, and even disappeared altogether at times, thus producing a colourless halo. There was neither pain nor marked injection of the eyes at any time. Nor was there any contraction of the visual field, though the visual acuteness sank to $\frac{3}{4}$—$^{1}/_{10}$ of the normal during the attacks of tension.

Among the exciting causes of the attacks there came more and more into evidence the influence of the emotions—anger, passion, shame, and even the pleasurable excitement of stirring music or of a theatrical performance. Want of food, also breathing bad air in close stuffy rooms, brought on the rise of tension, which, on the other hand, was shortened or ended by exercise in the open air. In 1876 the patient learnt the value of physostigmine, and afterwards obtained unfailing relief by it, a single instillation always sufficing.

The frequent recurrences, interfering with his work, led him to consult Horner in Zürich in December, 1878. The latter advised palliative treatment for a time, with strict dieting and small doses of quinine. But in March, 1880, he iridectomised the right eye. In these days cocaine-anæsthesia was not known. The operation was thus performed without an anæsthetic, the eye being free from injection or tension at the time. (The visual acuteness and visual field still remained normal.) The incision was made with a keratome, and the pain resembled that of a somewhat severe burn. The healing was uncomplicated. A week later the left eye was similarly operated upon, a warning attack of tension having occurred in it. The operation on this eye was followed by acute pain and injection. The onset of "malignant glaucoma" was feared, but the pain subsided after an injection of morphia, and there was no more trouble. The operations left astigmatism, 0·75 D against the rule in each eye.

A year later there was one small recurrence of glaucomatous symptoms. Except for this there was no trace of tension or of its results during the remaining 28 or 29 years of the patient's life. The only troubles were some increase of the old sensitiveness to light, due to the colobomata, and annoyance and worry from the curiosity and ill manners of people who noticed and commented upon the abnormal appearance produced by the iridectomies.

H. HERBERT.

A. Antonelli. **Some Considerations Regarding Traumatic Hæmorrhages into the Eye.** *Rivista Italiana di Ottalmologia*, July and August, 1909.

It is chiefly with the prognosis that Antonelli deals in this brief article ; the prognosis seems always doubtful in cases of hæmorrhage following even an apparently trifling superficial injury, the blood clots not being at all numerous but limited to a certain area in the vitreous. The matter is one of great importance also, particularly in connection with medico-legal reports, because the opinion formed at an early stage in the history of the case, shortly after the injury, may have to be modified later on. Antonelli has been astonished at the frequency in which a large hæmorrhage into the vitreous may occur after a contusion of the globe, apparently not a severe one and in a young individual, in cases, too, in which there is no visible solution of continuity of the ocular membranes—even of the bulbar conjunctiva. It is singular to notice how much damage may occur internally in the eye while the exterior parts appear wholly uninjured. So, too, Combaudon has shown that inflammatory changes may occur posteriorly in the eye under exactly the same conditions of a healthy person, a healthy eye, and a trifling blow on the anterior part. The lesions may take the form of an optic neuritis, or of patchy choroido-retinitis more or less close to the macula, and appear to result in a very considerable number of cases from the eye being struck with a particle of metal, stone, glass or what not while the patient was at work ; they are not easy to explain—one can only regard them as caused by shock transmitted through the vitreous humour from the cornea. This transmission will be more ready the higher the tension of the eye at the moment, and will cause a displacement of the anatomical elements of the deeper portions more or less, and, as regards the vascular system, a brief constriction followed by a paralytic dilatation. To some extent this helps to explain matters because it is from the posterior vessels, says Antonelli, the vessels in the posterior half of the eye, that the hæmorrhages make their way into the vitreous and not nearly so frequently from the ciliary body. Antonelli carefully excludes from the scope of his article the cases, occurring in diabetic patients, in which an abundant hæmorrhage takes place into the posterior part of the vitreous, and those not very dissimilar cases, found in young men, in whom recurrent hæmorrhage takes place. He concerns himself rather with the large flocculent or blackish masses, nearly stationary when first they occur, rendering ophthalmoscopic examination impossible, gradually in the course of weeks breaking down into smaller masses and flocculi, chiefly to be found at the bottom of the vitreous chamber. In other cases the hæmorrhage seems to spread itself out as a thin layer of blood in the anterior choroidal or ciliary region. In cases of this class the blood may be completely absorbed after a long period, and afterwards there remain patches of atrophy and patches of pigment far forward in the choroid coat, with the retina affected as well. These phenomena may occur after very slight injuries with a small fragment of metal, and may for a long time remain quite unchanged, so long as to constitute a difficulty in compensation questions. One is obliged in such a case to say frankly that it is impossible to state what amount of improvement may yet take place. W. G. S.

BÉAL (Clermont-Ferrand). **Retinal Hæmorrhage, Œdema of the Retina and Optic Atrophy from Compression of the Thorax and Neck.** *Annales d'Oculistique*, Aug., 1909.

RETINAL hæmorrhage from compression of the thorax is rare, œdema of the retina followed by optic atrophy from a like cause is rarer still.

The patient, a boy aged 14, was working near a revolving shaft, his apron was caught by the shaft, he was flung on his knees and his chest and neck forcibly compressed against the shaft.

The patient was released after a few minutes and was found to be much cyanosed. There were large subconjunctival hæmorrhages in both eyes. No cutaneous ecchymoses. The next day there were considerable ecchymoses of the face, lids, conjunctiva and neck.

Later it was noticed that the pupillary direct light reflex of the right eye was abolished, and the patient was quite definite in his statement that the left eye was quite blind for two hours after the accident; but no detailed examination was made till the 8th day. The right eye was then found to have œdema of the retina with cherry red spot at the macula, and near the latter a small retinal hæmorrhage. Disc normal, except that the arteries were very small. Optic atrophy subsequently developed in the right eye. The left fundus was normal.

As an explanation of the temporary amblyopia in the left eye the author suggests three possible causes:—

1. Compression of the nerve by an orbital hæmatoma.
2. Œdema of the choroid from venous dilatation.
3. Commotio retinæ.

It must be noted that the patient mentioned the temporary loss of vision of the left eye some days afterwards. No investigation was made during the two hours that the sight was affected.

The fundus picture of the right eye was exactly similar to that of so-called embolism of the arteria centralis. The vision of this right eye on the 8th day was reduced to counting fingers at two feet. The visual field was full for white and colours. The retinal œdema persisted for some weeks, at the end of five weeks it could still be seen faintly. Optic atrophy developed in this eye whilst the patient was under observation.

No general cause for such a condition could be found, nor was there anything in the nature of a fractured base to account for it.

Some interference with the blood supply of the arteria centralis is indicated, either thrombosis, endarteritis, embolism or a rupture of the inner coat.

The author favours the last supposition and believes that the compression of the thorax caused such an enormous increase in blood pressure that the inner coat of the arteria centralis ruptured (probably close to where the artery enters the optic nerve); the coat would then tend to curl up causing almost complete obstruction to the blood stream. This theory explains the symptoms better than any other, viz., the early loss of visual acuity, the contracted retinal arteries, the loss of the pupillary direct light reflex and the slight improvement in vision which took place in the early days before atrophy came on.

E. W. BREWERTON.

JAMES BORDLEY, jun., and HARVEY CUSHING (Baltimore). **Alterations in the Colour Fields in Cases of Brain Tumour.** *Knapp's Archives of Ophthalmology*, September, 1909.

REVERSAL of the colour fields or very marked contraction of the blue field so that it becomes smaller than the red field has long been supposed to be a manifestation of hysteria. In the present paper Bordley and Cushing show that this reversal of the colour fields (dyschromatopsia) may occur as a symptom in an early stage of brain tumour. In these cases they think that the colour disturbance is definitely one of the pressure symptoms and not simply a functional disturbance grafted on to an organic disease. The most prominent feature in the change of field would seem to be the limitation of the field for blue. This may take place to a varying extent so that in some cases the field for blue is entirely inside the field for red, while in other cases the fields interlace,* and occasionally relative peripheral scotomata for blue were found. Complete achromatopsia occasionally occurred. These colour disturbances do not seem to be dependent upon the presence of neuro-retinal œdema because in 4 of the patients observed they preceded any appreciable ophthalmoscopic changes. It would be of great interest to know whether these four cases had suffered from temporary attacks of blindness. The present writer has recorded some cases in which temporary amaurosis preceded the development of any disc changes. And it seems not an improbable hypothesis that these colour disturbances may in some way be related to the temporary amaurosis.

This interesting paper is based on 56 cases, and in only 6 of these was there no disturbance of the colour fields. In 41 out of 42 cases examined after operation the colour fields were restored to their normal relative position.

Leslie Paton.

B. Hird and W. F. Haslam. **A Case of Spontaneous Pulsating Exophthalmos.** *The Lancet*, Feb. 13, 1909.

The authors consider that spontaneous cases of pulsating exophthalmos are all probably due to arterial degeneration, caused by syphilis or atheroma, leading to ulceration and rupture of the artery.

The case they report is that of a widow 24 years of age. She has one child living aged 4 years; she has had no other children and no miscarriages.

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* Some years ago the reviewer found a similar interlacing of colour fields in a few cases of disseminated sclerosis in which the disease had affected the optic nerve.

When she was 12 years old she had something wrong with the left knee, for which she had to wear a plaster case.

No history of syphilis could be obtained and there were no signs of it.

Her work is stated to be of a light nature.

The onset was sudden and began with noises in the head and pain round the right eye. The next day there was vomiting, probably from disturbance of the cerebral circulation; at this time the right eye became prominent, and she also noticed she had a "black eye."

She was seen two days after the onset of her symptoms, and at this time with the proptosis there was visible pulsation.

The "black eye," the authors point out, was obviously due to a large intra-orbital hæmorrhage; the extravasation was limited strictly to the orbital margins. There was a distinct double bruit, heard best midway between the external canthus and the external auditory meatus; the systolic element was the most marked. At the angle of the jaw the second sound was distinctly musical.

It is of interest to note that pressure on the right common carotid stopped the noises as far as the patient was concerned, but that they could still be heard with the stethoscope.

The pupils were equal and active and the vision with correction $^6/_{18}$ in either eye. Ophthalmoscopically, the veins in the right eye were a little distended and showed a jerky pulsation.

About a month later the patient developed diplopia, and movements outwards of the right eye were limited; about this time the dilated venous mass near the upper and inner angle of the orbit began to develope: the globe was displaced downwards at this time.

After a preliminary course of rest and iodide of potassium, the common carotid artery was tied on the right side. This was followed by some improvement, but, as the noises had again become troublesome, the angular vein was tied on the same side. The operation was not followed by thrombosis of the cavernous sinus.

The patient was able to resume work for a while but again came under treatment some months later; at this time hearing was found to be defective on the right side, vision was then $^6/_{24}$ with correction. The patient has since given up work, and is still under observation. J. F. CUNNINGHAM.

STARGARDT (Strassburg). **Progressive family degeneration in the Macular Region.** *v. Graefe's Archiv für Ophthalmologie*, 71, 3.

THE author has observed this affection, not hitherto described, in two families. The first (Family H.) consists of four persons, all affected; while the second (Family N.) consists of five persons of whom three are affected. The parents in each case were quite healthy. The ages of the patients at the time of observation were from 12 to 20.

The original paper should be consulted for details of the history and examination of the individual cases, and also for the plate whch gives two examples of the conditions described. The following summary gives the chief features common to the cases as a whole. The condition affects brothers and sisters whose parents are healthy and give no evidence of ocular disease. There is no history of eye disease in the family and the parents are not blood relations. The visual defect first makes itself felt about the 12th to the 15th year and progresses steadily, though apparently very slowly at the beginning and end of its course. The defect involves the central vision. In the earliest period there is a central scotoma for red and green, later a relative scotoma also for white and the other colours, and finally total loss of central vision.

The striking fact that the patients could all write well, in spite of reduction of visual acuity to the counting of fingers, shows that the defect had not been congenital but must have come on after some years of school life. The peripheral field of vision is always normal both for white and for colours. Colour vision is normal and there is no disturbance of the light sense or power of adaptation. It is possible that the macular changes begin before subjective loss is noticed, but in one case at least the defect was present subjectively before any changes were visible.

The disease is essentially one of the macular region, although the complete picture includes changes beyond the limits of that area.

In its earliest form we find a certain irregularity of pigmentation in the macula, and some yellowish-grey spots in that region scarcely contrasted with the fundus. At the same time there is loss of the foveal reflex. At a later stage small yellow or orange spots appear, which may coalesce to form larger ones, but they are always small and only visible in the erect image. At this stage small amorphous spots of pigment are scattered over the affected area. Both the foveal and the macular reflex are lost. The yellow spots spread over a more extended area while the changes at the centre become more intense.

The foveal change may take the form of a dirty greyish yellow spot $\frac{1}{3}$ of a disc diameter surrounded by a pigment ring, or of an orange yellow spot of circular shape surrounded by a grey line sharply defined on its central side but gradually fading off towards the periphery (this form resembles the "macular holes" of Haab), or there is a deposit of dense amorphous pigment masses at the centre, while in some cases we may see choroidal vessels shining through. In one case, at this stage, there were at the centre fine white specks like those of albuminuric retinitis with fine white streaks radiating from them to beyond the limits of the affected area. In the same case there were a few individual "bone corpuscle" clumps of pigment.

Finally a somewhat sharply defined area is formed at the macula, horizontally oval, with a diameter of $1\frac{1}{2}$ to 2 disc diameters, its edges pigmented, its base of dirty yellowish grey colour, covered with fine amorphous pigment masses, and with a few greyish-yellow choroidal vessels showing through.

In all cases except the earliest there were also some small white spots, only visible on direct examination, something like those of retinitis punctata albescens, and probably situated in the deeper retinal layers; either confined to the neighbourhood of the macula or extending as far as the larger vessels, or even beyond the disc. The fundi were otherwise normal, with the exception of slight temporal pallor of the discs in the later stages, and there were no other eye defects, no general disease or congenital anomaly, and no past illnesses of any significance. One notable feature is the very close resemblance of the changes in the two eyes at all stages.

The disease apparently begins in the "foveola" and ultimately affects an area wider than the limits of the macular reflex. In many cases the appearances suggest complete atrophy of the retina at the macula. There is some doubt as to whether the primary change is choroidal or retinal; on the whole the facts seem to suggest the latter. The author thinks the condition is degenerative rather than inflammatory, and he points out that it is somewhat analogous to retinitis pigmentosa while it affects the part of the retina in which cones predominate. The proximate cause is probably a circulating cyto-toxin. A. J. BALLANTYNE.

WEHRLI (Frauenfeld). **A New Case of Nodular Keratitis.** *Klinische Monatsblätter für Augenheilkunde*, September, 1909.

IN previous publications the author described two cases of nodular keratitis occurring in two brothers, and the present paper deals with the case of the third and youngest brother who subsequently became affected.

The patient, a gardener 28 years old, had always had good health and sight until his 26th year, when his sight began to fail. He underwent treatment at the Royal Ophthalmic Hospital, London, where a positive Calmette reaction was obtained, but his vision, at this time $^6/_{18}$, did not improve.

On the patient coming under the control of Dr. Wehrli, a careful physical examination was instituted, and the evidence of percussion and auscultation, confirmed by the use of the X-rays, as in his two brothers, demonstrated the presence in the lungs of foci, which in the light of the positive Calmette reaction were diagnosed as latent chronic tubercular lesions. The eyes presented a typical picture of Groenouw's nodular keratitis, differing only slightly from the conditions observed in his brother.

The author believes that we have here to deal with a form of tuberculosis and, while admitting that three cases are too few to found general conclusions upon, contends that in this instance thorough examination by modern methods and observation over a period of approximately ten years counterbalance the quantitative deficiency in the evidence. He points out that the affection usually begins in youth or early adult life, no case occurring before the fifth year being recorded, and considers that the evidence is against a congenital or hereditary origin.

Stress is laid on the presence in all three cases of latent tubercular foci in the lungs which might have been undetected had the examination not been made by an expert in pulmonary diagnosis and its results confirmed by the tuberculin test and the X-rays.

Microscopically the features of a chronic superficial parenchymatous inflammation were present with masses of epithelial cells lying close under Bowman's membrane and gradually becoming caseous. These appearances corresponded closely with those found by Schieck to be produced by inoculation of the cornea with tubercle bacilli of low virulence.

Lastly, in several of 32 smear preparations made from the subepithelial corneal nodules in one case and stained by Hirsch's method, granular tubercle bacilli were found. Special care was taken in obtaining the material to avoid contamination from the conjunctival sac so as to exclude organisms such as the bacillus xerosis. The bacilli found resemble the form of tubercle bacillus which occurs in tuberculous lymphatic glands and remains almost always unstained by Ziehl-Neelsen's method but is stained by Much's process, and has been found experimentally to be virulent.

The paper closes with an account of Much's stain, which is a modification of the familiar Gram.

The discovery of these bacilli by the microscope is regarded by Wehrli as conclusive evidence in favour of his view, indeed as precluding all further discussion. Nevertheless one may safely assume that the results of cultures and inoculations will be awaited with interest, and that without confirmation by these methods the tubercular ætiology of nodular keratitis advocated in this interesting but not quite convincing paper can hardly be regarded as established. H. M. Traquair.

Weinstein (St. Petersburg). **Two Forms of Sagging of the Skin of the Upper Lids: Ptosis Atrophica and Ptosis Adiposa. A Case of Ptosis Adiposa with Spontaneous Prolapse of the Lachrymal Gland.** *Klinische Monatsblätter für Augenheilkunde*, October, 1907.

The author believes that ptosis atonica or blepharochalasis and ptosis adiposa are different manifestations of the same atrophic process, and gives an account of a case observed in Belljarminow's clinic in St. Petersburg, together with a critical examination of the literature of these two uncommon conditions.

Sichel in 1844 described "ptosis lipomateux" as a modification of "ptosis atonique" and distinguished both from "ptosis paralytique." In "ptosis atonique," according to this writer, the skin of the upper lid is flabby and shrivelled, sometimes presenting transverse folds which may hang down below the free border of the tarsus. On pinching up the skin between the fingers the fold thus formed effaces itself slowly, often not without some manipulation. If this excess of skin is held up the lid recovers its mobility more or less completely. The attempts of the levator palpebræ to raise the lid may be observed beneath the skin. Both eyes are usually affected.

"Ptosis lipomateux" resembles the atonic form, but here the skin is smooth and distended, presenting a somewhat elastic swelling. Between the skin and the orbicularis palpebrarum there is a deposit of fat most frequently continuous with the orbital cellulo-adipose tissue, which separates the fibres of the muscle and penetrates between them to its position beneath the skin. Usually this mass is enclosed between the edge of the lid and the covering fold, often however it hangs in front of the lower part of the lid like a pad or a little transverse sac. The weight of this mass impedes the movements of the lid.

Cases recorded by later writers are quoted and one or two points are added to Sichel's description. The author attaches importance to certain features common to both affections: the integrity of the levator palpebræ, the time of onset—youth or early adult life, the occasional occurrence of prolapse of the lacrymal gland, sometimes unilateral, more often bilateral, and, in ptosis adiposa, to the fact that the fat found beneath the skin of the lid has no capsule but is continuous with that of the orbit.

The case which he describes presented features similar to those of Sichel's "ptosis lipomateux." A peasant, 21 years old, was afflicted with steadily increasing swelling of the upper lids of six years duration. When the eyes were opened the atrophic skin of the lids hung down over their free borders and fatty tissue could be felt through it. Externally and a little below the orbital margin on each side the lacrymal gland could be felt as a soft, elastic, oval body, the size of a raisin, freely moveable in all directions, especially upwards. The fat was found to have no capsule and to be continuous with the orbital fat.

Weinstein holds that the same atrophic process is responsible for both conditions. When the skin is affected ptosis atonica or blepharochalasis is produced, and, by the spread of this atrophic process to the deeper connective tissue of the orbit, the orbital fat is permitted to pass forwards between the fibres of the orbicularis to a position beneath the skin of the upper lid, then falling down over the tarsus producing the picture of ptosis adiposa. In a similar way the supports of the lacrymal gland may be loosened permitting it to prolapse.

As regards the ætiology of this atrophic process the author admits that we are completely ignorant. He would group it along with idiopathic progressive atrophy of the skin, paralytic erythema, erythromelalgia and chronic progressive acrodermatitis, and suggests the term *ptosis atrophica* instead of ptosis atonica. In some cases nervous, especially vasomotor, disturbances have been observed, and many writers have attached importance to the influence of psychical excitement.

Of the authors quoted only Loeser affords complete support to Weinstein's view. Others have not insisted on the close relationship of the two conditions, regarding the presence of fat in the lid as due to a fat-hernia or to hypertrophy of the subfascial fat, and the prolapse of the lacrymal gland as an accidental complication or a congenital anomaly.

The author is not prepared to deny the possible existence of a form of ptosis adiposa depending upon a true hypertrophy of the subfascial fat without atrophy of the skin of the lid.

There are numerous references to the literature on the subject, though Haab's "Atlas of external diseases of the eye," in which the conditions are figured, is not mentioned. In this work both forms are termed blepharochalasis and the plate corresponding to ptosis atonica is described as representing a *later* stage of the disease.

The paper is an interesting and suggestive contribution to our knowledge of these forms of ptosis. H. M. Traquair.

EXTRACTION OF CATARACT IN THE CAPSULE.

To the Editor of the "Ophthalmic Review."

Sir,—

In the November issue of the "Ophthalmic Review" some figures are quoted from a paper read by Capt. Gidney, I.M.S., at the Bombay Medical Congress. Statistics published by Major Smith of Jullundur are compared with some of my own, greatly to the advantage of the intracapsular operation. The comparison is misleading and unfair, since the statistics are not at all comparable. The fact that the figures have been accepted by the reviewer and reproduced without comment appears to show the need for protest.

Major Smith is reported to have had 99·27 per cent. successes, 0·38 per cent. partial successes, 0·34 per cent. failures in the 2616 intracapsular operations, to contrast with my 92·1 per cent. successes, 6·2 per cent. partial successes, and 1·7 per cent. failures in 1262 capsule-laceration operations. Smith's figures are taken from a paper published in the "Indian Medical Gazette," September, 1905, and in the "Archives of Ophthalmology," November, 1905. They were published as "first class results," "second class results" and "failures." The number of his failures corresponds exactly with the number of his suppurations. Everything else therefore must have been placed among the first and second class results. And we must assume that the second class results or partial successes refer distinctly to operative casualities for they only total 0·38 per cent., while the percentage of "capsule left behind" was 4·28, and of iritis 0·3. There is no mention of visual results in relation with these figures. In Indian cataract work there are many imperfect visual results owing to pre-existing disease of the eye, more particularly old pannus and corneal leucomata, not to mention occluded pupils, vitreous opacities, fundus diseases, glaucoma, etc. It can serve no good purpose to include these among "first class results." The statistics quoted by Gidney of my own work are taken from p. 279 of my book on "Cataract Extraction" (1908). They are visual results at the time of discharge from hospital. The "failures," 22 in number, were nearly all either of purely temporary nature (pupils filled with cortex alone or with cortex and blood) or due to pre-existing disease of the eye, or to intraocular hæmorrhage. There were no suppurations, and only two occluded pupils from iritis. Similarly the partial failures, so far as could be ascertained, were mostly conditions remediable by "needlings" or due to former disease of the eye.

Thus judging the two series of results by the only standards really available in Smith's report, viz., the percentages of suppurations, iritis, loss of vitreous, etc., the comparison is not, as Captain Gidney claims, very favourable to the intracapsular method, but distinctly the reverse. Capt. Gidney's misrepresentation must tend to increase the distrust with which Indian statistics are even now received. It is the more to be regretted in that the Jullunder work needs no manipulation of figures. Major Smith and his pupils at Jullunder are to be congratulated most heartily upon the brilliant results reported at the Bombay Congress, and upon the elaboration of technique there described.

I am, Sir, Yours truly,
H. HERBERT.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, November 11th, 1909.

The President, Dr. G. A. BERRY, *in the chair.*

An instrument for the examination of the eye under water in the erect position, and its application as a means of treatment.—Dr. Rayner D. Batten.

The instrument consists of a metal eye-cup, of a somewhat similar shape to the ordinary eye-bath, with smooth rounded edges. A short metal tube is soldered into its upper and lower surfaces, to which india-rubber tubing can be affixed. The upper india-rubber tube is short—about 2 in. long—and can be closed by a clip. The lower india-rubber tube is about one yard long, and is connected with a reservoir. The anterior surface is a plane glass. The cup should not be less than $^5/_8$ in. in depth at its shallowest part, so as to give room for the coming forward of the lids and globe.

The reservoir should be half filled with a warm non-irritating fluid, and given to the patient to hold; weak glycerine and water being found the best. The cup should then be applied over the eye, taking care that its margin covers the inner canthus. For examination purposes, the upper margin should be applied to the upper lid first, so as to raise it; the patient is then directed to raise the reservoir to about the level of the cup, and the clip is held open until the fluid rises to the upper opening, when the clip is closed, and the patient is directed to lower the reservoir about 9 inches to a foot. When successfully applied, the cup will then remain in position.

Under the influence of this water bath, the corneal reflex practically disappears, the iris appears flat and its margins sharply defined so that the angle of the anterior chamber is visible in detail. Haziness of the cornea, especially that due to glaucoma, is considerably diminished, and a clear view of the fundus is obtained. It is perhaps in the examination of the fundus of high myopes that the advantages of this method are most striking, as by abolishing the corneal curvature it lessens the total refraction by some 30 dioptres, and enables the surgeon to see every detail as distinctly as in an emmetrope by the ordinary method.

There are certain discomforts likely to arise from prolonged application of the cup, viz., increased tension of the eyeball, slight proptosis, some redness and injection of the ocular conjunctiva, and the pupil often becomes contracted.

This instrument may also be applied as a continuous eye-bath.

A case of Pigment on the anterior capsule of each lens, probably representing a rare type of persistent capsulo-pupillary membrane.—Mr. S. Stephenson.

Stanley B., aged 10 years and eleven months, came for treatment of strabismus. On examination it was found that in each eye there were innumerable particles of pigment occupying a sub-capsular position in each lens. In the left eye the arrangement of the spots assumed a C shape.

Choroidal Degeneration.—Mr. Dorrell.

N. D., aged 31, a female, had $^6/_6$ with correction in each eye; but on examining the fundus of the right eye there was discovered above and to the temporal side of the macula a circular area of choroidal degeneration. Three zones were noticeable, an outer dense pigmentary deposit, inside this a circle of white fibrous-looking material, and the centre gave a red reflex somewhat paler than the rest of the fundus. The choroidal vessels could be seen passing across the patch, and round about the macula were some small buff-coloured spots similar to miliary tubercle nodules.

A case of Unilateral Optic Atrophy.—Mr. J. Herbert Parsons.

This patient was exhibited before the Society on March 11th of this year, and Mr. Parsons brought the case forward again to shew how completely the signs and symptoms had disappeared in spite of the existing pallor of the optic disc. The vision was $^6/_6$, with a perfectly full field.

Papers.

Oxycephaly.—Mr. W. H. Beaumont.

Mr. Beaumont enumerated the previous papers written on oxycephaly, referring more particularly to the eye symptoms met with in this affection. He spoke of the optic neuritis and atrophy noted by several observers as peculiar to this condition, but he considered that these were the results of meningitis or distortion of the optic foramen. The accepted pathology of oxycephaly was a premature closing of the sutures of the skull due to meningitis which occurred in intra-uterine life. Mr. Beaumont then described the leading features of such cases recently exemplified in a patient, aged 13 months, which he had had the opportunity of watching since November, 1908. He described minutely the bony abnormalities, and remarked on the otherwise normal condition of the fundus of the eyes and the general state of health. He alluded to the cases already brought before the Society and noted the preponderance of males over females, which he considered ought not to be regarded as a mere accident; and inasmuch as the heads of males are generally larger than those of females, this fact might have some bearing on the question of intra-uterine ossification. Mr. Beaumont answered the question of whether trephining in these cases was advisable or not in the negative.

The Measurement of the desire for Binocular Vision by means of the Diaphragm Test.—Mr. N. Bishop Harman.

Mr. Harman showed that the diaphragm test was applicable for measuring the desire for binocular vision. The test cards seen through the hole in the screen are viewed for the greater part by each eye separately, but a median band is seen by the direct vision of the two eyes together; this median band acts as a balancer to the eyes and their controlling mechanism, and for this reason Mr. Harman calls it the "Ocular poise." It was found that different individuals required different breadths of ocular poise, the smallest measure representing the greatest amount of desire for binocular vision. He has added to the diaphragm test an adjustable shutter with scale attached by which the measurement is readily made. Mr. Harman considered this test specially suitable for cases of occasional divergent strabismus with feeble convergence.

The Measurement of Hyperphoria by means of the Diaphragm Test.—Mr. N. Bishop Harman.

If a line of letters or figures be viewed through the hole in the screen of the Diaphragm Test, they appear in perfect order and alignment to the man with good binocular vision and balance. In the case of latent squint the order and alignment of the letters is altered. The line 123456789 will appear on two levels to the man with hyperphoria; thus, in left hyperphoria the letters will be placed 12345
56789.

The displacement is found to be constant for equal degrees of divergence, and proportionate for different degrees. In order to be able to measure the degree of divergence directly a test card has been prepared; one half bears a vertical tangent scale, the other a horizontal pointer. When viewed through the Diaphragm test, the scale is seen by one eye, the pointer by the other. When there is hyperphoria the pointer is displaced from its neutral point and appears shifted upwards or downwards according to the kind of heterophoria present. The degree indicated is the degree required in the correcting prism.

The President, in his remarks, said he doubted whether Mr. Harman was justified in attributing the differences obtained by the diaphragm test as regards the width of the band required to maintain binocular vision solely to the difference in the desire for fusion; he thought this was complicated by the degree of convergence required for the test.

MALCOLM L. HEPBURN.

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The Ophthalmic review

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